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[OFFICIAL NOTICE.]

Change in Location of Secretary's Office, American Gas Light Association.

OFFICE AMERICAN GAS LIGHT ASSOCIATION,
32 PARK PLACE, ROOM 36, NEW YORK, May 10, 1884.

The Secretary would call the attention of the members of the Association to the change in his address. Communications to him may be directed to the above address, or care of the Gas Company, Bergen Point, N. J.

C. J. RUSSELL HUMPHREYS, Secretary.

[OFFICIAL NOTICE.]

Postponement of the Annual Meeting of the Central New York Gas Engineers Association.

SYRACUSE, NEW YORK, April 27, 1884.

The Fifth Annual Meeting of the Central New York Gas Engineers Association will be held at Corning, N. Y., on

THURSDAY, JUNE 5TH, 1884,

instead of on May 22d, as previously announced in the JOURNAL of April 16. Active membership in the Association is open to any person interested in gas manufacture in Central and Western New York, and all such are invited to join. A cordial invitation to members of other associations to be present at the meeting is hereby extended. W. A. WOOD, *Secretary.*

THE GUILD OF GAS MANAGERS.

When the subject of forming gas engineering associations was agitated in this country some years ago, the principal difficulty encountered by the pioneer organizers was the lukewarmness, not to say positive coldness, with which the initial efforts were received by a not inconsiderable portion of the fraternity. The idea of banding together for mutual interchange of knowledge was in such great and striking contrast to the secrecy which had theretofore prevailed amongst the gas engineers of the country in the practice of their profession, that, viewing the matter now from the standpoint on which such opinions were then held, and giving proper consideration to their reasonableness and weight at that time, it is not difficult to conceive why such coldness did exist toward a universally hearty indorsement of a project that has worked since to the great advancement and positive benefit of every individual connected with the gas industry, be that individual either interested practically as an engineer, or financially as an investor.

It is useless to say now that such objections were poorly founded; looked at in the light of the present, certainly they were; but to the prudent, thoughtful man the errors of the past serve as the safest index guide to an avoidance of the perils of the future. When the civil war had terminated, as to positive shedding of blood, there still remained for a long and wearisome period the smouldering fires of sectional rancor and hatred. Time alone could wear out this feeling of personal bitterness, but time has done it effectively and well. The same ending to that period of strife saw one section of the country revelling in wealth, while another portion of the land was stripped and prostrate. Without any competition worthy of serious consideration, the Northern gas producer had full power and freedom to

charge what he saw fit for his illuminator; it is needless to add that he made the best use of his opportunity. His Southern confrere, dealing with an impoverished people, had but little incentive to progress, and consequently had only to watch and wait. Still, a change was in store for both sections, and the change, so far as the gas maker was concerned, was to be shared by North and South alike. The spouting wells of Pennsylvania continued to give up their wealth of oil so lavishly, and the art of refining had been brought to such perfection, that the wiser heads in the gas business concluded that an enemy had come at last, and that the enemy had come to stay. If each was to plod along in the old-fashioned way, without one knowing what the other was doing, troublous times would have been encountered in repelling the threatened onslaught of the oil barrel.

The counsel of the wiser heads prevailed, and gas engineering associations were formed, and, despite the absence of general unanimity at first, flourished and grew strong. The New England Association of Gas Engineers points with pardonable pride to its record of fourteen years; the American Gas Light Association, embracing within its ranks a membership from Maine to California, knows no north, south, east, or west in its designatory title; and then the young giant of the West—the Western Gas Association—whose growth has been marvelously rapid, and whose zeal and activity is characteristic of the section in which it had its birth, entered the lists. Coming back again to our own end of the Continent, we have the Central New York Gas Engineers Association, the Society of Gas Lighting, and the Guild of Gas Managers. All these various bodies of earnest, progressive men have but one single object in view, and that the praiseworthy one of advancing the general aims and objects of their business.

Although the two last-named Societies have not given much publicity to their doings, the papers that frequently appear in the columns of the JOURNAL, as read before the Society of Gas Lighting, give evidence that its members are of the industrious and painstaking sort. We hope soon to be authorized to publish the papers presented at the meetings of the Guild of Gas Managers; and we might here state that the Society of Gas Lighting and the Guild of Gas Managers work pretty closely upon similar lines of procedure.

It was announced in our last issue that an informal meeting of the latter Society would be held at Pawtucket, R. I., on Wednesday, May 7, and a general invitation to the gas fraternity was extended. The meeting was held at the works of the Pawtucket Gas Light Company, and the members and guests were received in proper shape by Manager S. G. Stiness, who, in order that his visitors might be properly fortified for beginning the work of inspection of his thoroughly equipped gas manufacturing establishment, had a light luncheon in readiness; this being disposed of, a tour of the works was made, particular interest being attracted to the arrangement and working of the system of purifier valves, these being the invention of Mr. Stiness. When every portion of the plant had been examined, the regular business meeting of the Guild was held; the topics discussed included a dissertation on the "Management of Hydraulic Mains," and a consideration of the "Salisbury Process." When the business session had terminated, an elegant dinner was served at "Dispeau's," and the parts thereof that were left went to show how well the feast was appreciated. Dinner having been dispatched, the party visited the rooms of the Business Men's Association and other places of interest in the city, when the final adieus were spoken and the May meeting of the Guild was a thing of the past, sure to be pleasantly remembered by those who participated in it.

Among the guests of the Society were noted Messrs. F. C. Sherman, of New Haven, Conn.; W. H. Down, of New York city; Andrew Hutchinson, Providence, R. I.; W. H. Learned, Newton, Mass.; C. S. Spaulding, Brookline, Mass.; C. F. Pritchard, Lynn, Mass.; E. G. Pratt, North Attleboro, Mass.; Hon. A. M. Norton, Nashua, N. H.; John P. Harbison, Hartford, Conn.; and Edwin Darling, Pawtucket, R. I.

The officers of the Guild of Gas Managers are as follows: President, Col. W. A. Stedman, Newport, R. I.; Vice-President, Mr. John Cabot, Lawrence, Mass.; Secretary, Mr. A. B. Slater, Providence, R. I.

NOT QUITE LIKE THE ORDINARY RUN OF JURIES.

In the JOURNAL for November 2, 1883, an account was given of a suit brought against the Metropolitan Gas Light Company, of New York city, in which the complainant, Mr. George Leeds, of No. 119 East 54th street, New York city, claimed a large sum of money as compensation for damages inflicted upon him through an explosion of gas that occurred in the cellar of his residence on a stated night in the month of August, 1878. It appeared, from the testimony of the plaintiff, that some one of the inmates of Mr. Leeds's household detected the smell of escaping gas on the premises. In the search that was instituted Mr. Leeds carried a naked light in his hand as a chief assistant. The source of the leak was traced to the cellar, but the naked light enacted a most prominent part in the discovery, and the explosion that resulted amply convinced the injured man of the bad policy of hunting for gas leaks in the "good old way." When Mr. Leeds had recovered from his bodily smarting, as is the usual custom nowadays with persons who, through their own neglect of the simplest precautions, meet with bodily accident, more particularly when they are dealing with a solvent corporation, he resorted to a lawsuit as the surest means of "getting even" with the Metropolitan Gas Company. Leeds claimed that the gas had escaped into the cellar because of a fracture in the service pipe, and contended that the company was liable, since it was the defendant's duty to see that the supply of gas was properly laid on and maintained. Nothwithstanding the strongly preponderating weight of testimony adduced by defendant's attorneys as to plaintiff's contributory negligence, the jury awarded Leeds the sum of $7,869.75. A successful appeal from this verdict having been taken, the second trial of the case took place before Judge Larremore and a jury on October 18, 1883. The defendant then, in addition to the plea of contributory negligence, proved that the gas service was injured on account of repairs that had been made to the water pipes leading to the house; but the jury, notwithstanding the strong case made out by defendant, failed to agree. The third trial was had on April 21 last, before Judge Van Brunt, and "twelve good men and true." The same testimony was given as on the former hearings, but the final result differed, inasmuch as a verdict was rendered for defendant. The Metropolitan Company is to be congratulated on having fought this issue to the end, as the result will no doubt have great influence upon the intentions of other seekers after a pecuniary salve to be applied to the healing of wounds or burns caused through hunting after gas leaks with naked lights.

The Havana Explosions.

According to advices received from Havana, Cuba, concerning the explosions that occurred there on April 29, it is learned that although great damage was done, the case is not quite so bad as was first reported. One of the holders of the Havana Gas Light Company was filled with gas, and collapsed from the violence of the concussions; their second holder had only three or four sheets of top section out of water, and beyond some indentations did not appear to have been materially injured. At the Spanish company's works two holders were badly damaged, and another one totally destroyed. The manufacturing plant of either company did not suffer much, and at no time was the city left in total darkness, the street lamps, on night of 29th, being all lighted by 9:30 P. M.; on the 30th the lamps were lighted at 7:30 P. M., and on the first of May the inhabitants were notified that gas might be as freely used as was desired. No figures as to damage have been given.

Annual Convention American Society of Civil Engineers.

Mr. John Bogart, Secretary American Society of Civil Engineers, has issued the following circular relative to the annual meeting of 1884:

The annual convention of this society for the year 1884 will be held at Buffalo, N. Y., beginning June 10, 1884. Sessions for professional discussion and one for the transaction of business will be held. The arrangements are in charge of a committee of gentlemen residing in Buffalo, in consultation with the members of the society at that city, and with the board of direction. The meetings of the convention will be held at the hall of the Young Men's Christian Association, at the corner of Pearl and Mohawk streets.

The first meeting will be held on Tuesday morning, June 10, at 10 A. M. On the evening of the same day there will be a public meeting, at which the convention will be welcomed to Buffalo by the Mayor of the city, the President of the Common Council, and the President of the Merchants' Exchange. The president of the society, D. J. Whittemore, Esq., will reply, and will deliver the annual address. Meetings will be held on the days following, and it is expected that the exercises of the convention will close on Friday evening, June 13.

Arrangements are in progress for visits to points of interest in and near the city. There will also be one day spent at Niagara Falls. Social receptions also will occur. Arrangements have been made by the committee for the accommodation of the visitors to the convention and their families at the Genessee House, the Tift House and the Mansion House. It will probably not be possible to accommodate all the visitors at any one of these hotels, but they are all within a short walk of the place of meeting. The headquarters of the Society will be at the Hall of the Young Men's Christian Association.

Members of the Society are invited to transmit to the Secretary papers that they are willing to present at this convention, in order that a place may be given for them in the programme. It is expected that papers on several interesting subjects will be presented. Reports will be expected from the committee on standard time; on the preservation of timber; on a uniform system for tests of cement, and those subjects will be discussed. Discussion is requested upon any of the above subjects by members who cannot attend the convention. The Secretary will be glad to present these if forwarded to him previous to the convention. It is particularly requested that papers offered for presentation at the convention be sent to the Secretary not later than June 1, so that proper attention may be given the subjects presented.

[A Paper read before the Society of Gas Lighting.]

Ten Years Experience in Working Retorts Without Dip Seal.

By Mr. F. C. Sherman.

Some seven years since I had the honor of calling the attention of this Society to the advantages to be gained by dispensing with the dip seal. At that time I had been working with unsealed dips for a period of three years, and seven years further experience only confirms the favorable opinion I then expressed in regard to this method of working retorts. I have never had either trouble or accident of any kind arising from working in this way with unsealed dips, and I have been unable to discover any inducement to return to the use of the dip seal. I first commenced with the practice of working with a level glass, but I soon abandoned that for a three-tenths inch pressure on the retorts. With the appliances ready to our hands, the workings of our exhausters are directly under our control, and there is no danger of introducing air into the gas through the exhauster. Engineers who attempted to work their retorts without the dip seal, and their exhausters without governors or compensators—or with unreliable ones—and who relied upon a man stationed at the throttle-valve to regulate the movements of the exhauster, soon came to grief, and were loud in their condemnation of this way of working.

The great improvements that have been made in the construction of governors and compensators, during the last ten years, render them almost perfect for the purposes to which they are applied; and, with a self-recording steam gauge to indicate whether the boiler has been properly looked after, there is now no excuse for a crooked pressure register sheet.

You are all aware that the chief advantage in dispensing with the dip is the prevention of the deposit of carbon in the retorts. In the paper I read to you seven years ago I estimated that, in working with a one-inch dip and a level glass on the main, it cost us, in the loss of labor, fuel, and materials for repairing retorts, $23 per year for each carbonizing vessel, simply to keep them free from carbon deposits. In the same paper I also stated that, working without the dip seal, we saved $15 per year in the working of each retort in the matter of scurfing. I still stand by those figures, and will further say that we got on last year with only one-half of one per cent. of our retorts being out of use on account of scurfing.

Another advantage we claim for this way of working is an almost entire exemption from the trouble of stopped stand-pipes; and since we elevated our hydraulic main some 21 inches from the covering of the arches we have had no hard pitch deposits therein. I am aware that where the main is kept level, and free from pitch or thick tar, with the dip-pipes carefully adjusted, all of the same length, and sealed in one-quarter inch of ammoniacal liquor, there will be no gain by dispensing with the seal; but the gas works where these conditions obtain may be counted upon your fingers. Indeed, they are exceptional. Where the mains are supported on the retort benches, as is usually the case, they are sure to get out of level from the unequal contraction and expansion of the brickwork, and not unfrequently through settlement. I have seen mains that showed a difference in level of several inches, with the consequence that some of the dips were sealed 6 inches, while others, in the same section, were unsealed.

Then, again, in regard to tar in the main. I have tried various methods for drawing off the thick tars from the bottom of hydraulic, and endeavored to keep the thin liquor on top, but cannot claim to have been successful.

To-day, after all the multiplicity of discussions in the different gas engineering associations, and that appearing in our technical journals, upon the advantages of dispensing with the seal, or reducing it to the lowest possible limit, it will be found that many works are running with 2 inch seal in tar. The gain that would accrue to works operating under such marked unfavorable conditions in discarding the dip, would naturally be a large increase in quantity, to say nothing of the enhanced quality, of the gas product.

Some years ago I visited a gas works of some magnitude where the manager was running the works under the conditions above named—viz., a 3-inch dip in solid pitch. The results were that with heats which had converted the tar into pitch, using the best Pittsburgh coal, and 30 per cent. of Cannelton cannel as an enricher, a 12-candle power gas could scarcely be obtained, and the yield per pound of coal did not reach over 4½ feet. The deposition of carbon was very heavy. The illuminating power of the gas suffered through a prolonged contact with the overheated retort; it was thus partially decomposed, and its carbon caused to be deposited on the sides of the carbonizing vessel.

In regard to the effect of working without dip seal upon the life of a retort, I fail to note that such life or duration is influenced one way or another by such dispensation. I have found (no doubt such has been the experience of you all) that a certain amount of carbon must be maintained in the retort pores, if the vessels are to stand up any length of time. It is beyond question, in order to get the best results from our retorts, that they must be kept free from the interior carbon accumulations—*i. e.*, from such an extent of accumulations as will interfere with their proper heating and charging; and I know of no better way of keeping down the carbon than by relieving the vessels from all unnecessary pressure caused by the dip seal.

A Novel Use for Coal Tar in the Vine Growing Districts of France.

Monsieur G. Jouanne, in a recent number of *Le Gaz*, says it is widely known what losses are occasioned to viniculturists in wine producing territories through the destructive agencies of the early spring frosts, as in the course of a few hours the prospect of a plenteous harvest is blighted. The symptoms of a hoar frost, usually manifesting themselves shortly before sunrise, unfortunately can only be discovered or detected by careful, vigilant watching throughout the entire night—even then it is difficult to foresee them, as this sort of supervision cannot be prolonged to any considerable extent without entailing upon the watcher great fatigue and decided personal inconvenience.

The preventative appliances hitherto used must be ready at any and every moment; and among such appliances may be mentioned stationary covers, small planks, straw mats, metal disks, as having been employed for protecting the vines from the killing hoar frost. All of these being in the nature of stationary covers, often possess but little value, as from any sudden change in the course of the wind their utility as a shield is good only in one direction.

The formation of artificial clouds, produced by the burning of tar, is, without doubt, one of the best protectors that can be used; and as gas engineers are directly interested in advocating and applying this system, we believe it will not be void of interest to them to learn the method adopted successfully in experimenting with tar smoke for the purpose of protecting vines against frost.

A row of flat-bottomed, open-mouthed porcelain vases, each containing 5 to 6 kilogrammes (12 to 14 pounds) of tar, is placed around the borders of the land to be protected. The vases are usually set from 20 to 25 meters (66 to 81 feet) apart. To facilitate and hasten the lighting a piece of oakum or a bunch of straw saturated with petroleum is stuck in the middle of the filled tar vase; with a similar piece of burning oakum, fastened to the end of an iron rod, the contents of the whole row of vases can soon be ignited. Almost immediately a thick, heavy smoke arises, continuing to ascend during the progress of combustion, and, being blown by the wind from whichever quarter it comes, soon spreads over the whole field. As it is generally during a calm that the frosts are most dreaded the absence of the wind only tends to increase the thickness of the smoke that issues from the vases and hovers among the vines; it is most efficacious, therefore, at the time it is most needed.

The vases should be provided with a lid, made of a simple piece of wood, when it is intended to place them in a position in advance of the time of their being needed, in order that their contents may not be exposed for too long a period to the action of the elements. These tar pots, arranged in this manner, and on the side of the field most exposed to the prevailing winds, are ready to be at once put to the use of protecting the vines as soon as the first symptoms of frost are felt.

In order that the vine grower may be notified of the near approach of the frost the following is suggested. A mercurial thermometer should be armed with a float and an electric contact so arranged that when the column of mercury would fall to a degree corresponding with a temperature approximating near to a hoar frost, the circuit of the pile attached to the thermometer would be closed, and thus put in action an electric alarm clock. This clock could be stationed in the proprietor's sleeping apartment, or in that of his superintendent; the thermometer might be placed in the field, or in any convenient location outside the house, in such a position as to be at once affected by any decided change in temperature. By this means the frost itself would sound the signal of alarm, and all would be in readiness to avert the threatened danger.

Advantages of Removing the Tar and Ammoniacal Liquor from the Bottom of the Hydraulic Main.

By S. W. Durkin.

[The subject of hydraulic main construction having of late been brought somewhat prominently before the attention of American gas engineers, more especially since Mr. Stiness gave his opinions on the subject at the recent meeting of the New England Association of Gas Engineers, we are incline d to think that the following paper on the above subject, read by the author at the March, 1883, meeting of the Southwest of England District Association of Gas Managers, will prove of interest to our readers. The paper is reproduced from the London *Journal*.—Ed.]

In approaching the subject at the head of this paper, I have no desire to

claim originality in what may be set forth further on, as the removal of these products from the hydraulic main was effectually accomplished by an arrangement of Messrs. Evans and Sugg, as illustrated in "King's Treatise on Coal Gas," Vol. II., p. 13. It is also alluded to in Mr. Eastwood's presidential address delivered at the Manchester District Institution of Gas Engineers on the 24th of February last (1883). It is likewise in use at the works of our President, as shown in the accompanying illustration (fig. 1). In the spring of last year, when visiting the works under the charge of our ex-President (Mr. H. Cockey), I found the same plan in operation; and this led me to the adoption of the principle at the works under my charge. Being about to make some alteration in the mode of taking off the gas and tar, etc., from the hydraulic main, a favorable opportunity presented itself for giving the plan a trial.

As you are very well aware, the plan formerly in vogue was to take the gas from the hydraulic through a leading main; the tar and liquor passing pitchy state, and only to allow the lighter tar to go forward for removal in the ordinary way; secondly, to retain a layer of liquor over the tar, or to get rid of the latter altogether, and, if possible, to keep the illuminating power up to the standard with little or no cannel. The plan adopted, as shown by fig. 2, was carried out as far as time permitted, but is capable of further improvement in some details (which I hope to accomplish before next winter); and up to the present time I have not been disappointed in the results, and hope to be more successful still. The tar, being constantly replaced, is fluid enough to run through a 2-inch cock, and once a week it is so drawn off. While this is being done ammoniacal liquor is pumped into the hydraulic to maintain the seal; this being also done several times through each week, so as to keep the tar as much as possible on the move.

Being anxious to see how matters stood, and having occasion to stop making gas, I had a manhole lid taken off the hydraulic, and found from two to three inches of liquor on the top of the tar, which formerly would

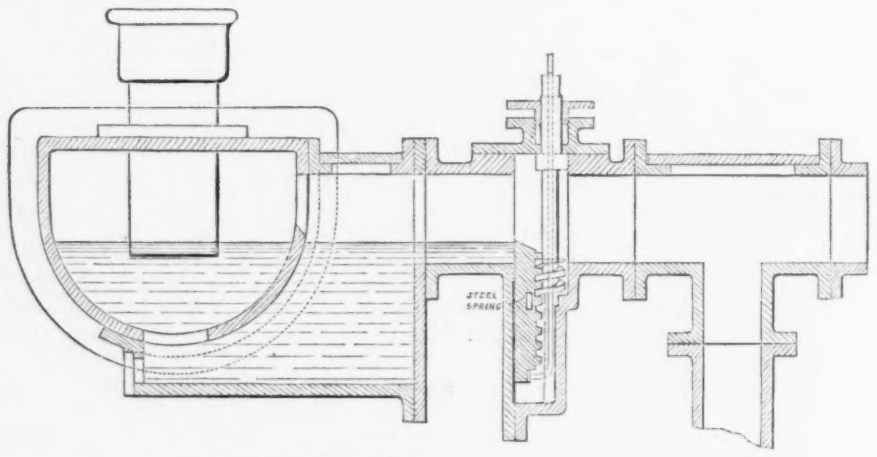

Fig. 1.—Hydraulic Main Arrangement at Weymouth.

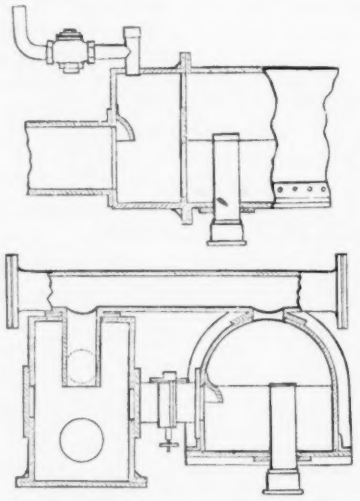

Fig. 2.—Hydraulic Main Arrangement at Southampton.

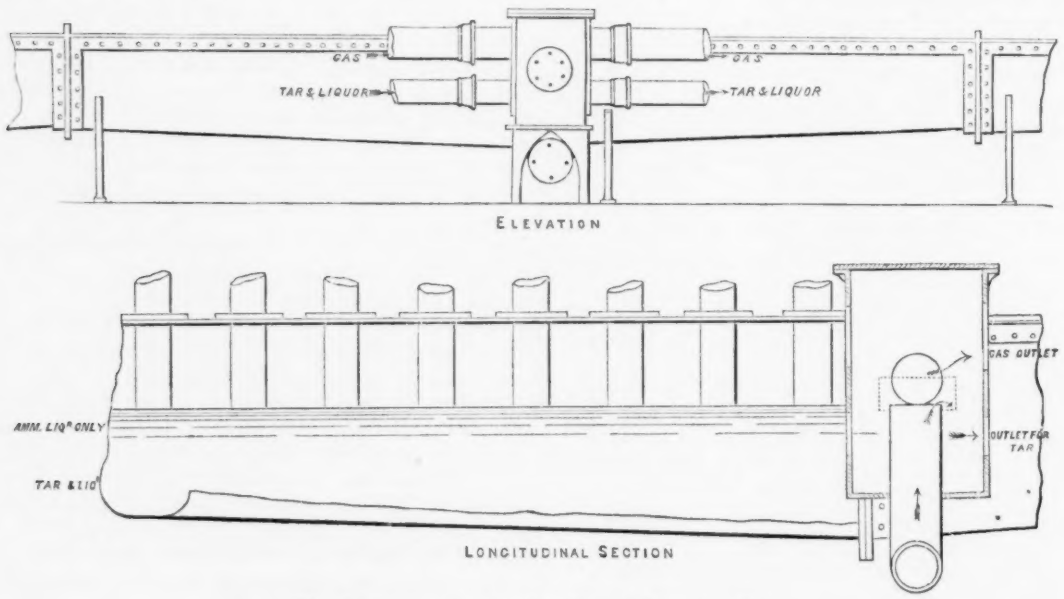

Fig. 3.—Suggestion for a New Form of Hydraulic Main.

to the tar-well by another route. But by this system a large quantity of tar was left to stew in the hydraulic main, below the overflow, so that in course of time the gas had to bubble through the heavy tar, with perhaps, in the good (?) old times, a 3-inch seal and no exhauster. Then came a change, when it was considered the correct thing to reduce the seal, and allow the gas, tar, and liquor to flow away together (with the idea of getting rid of the naphthaline) through horizontal pipes, and at the same time gradually reduce the temperature of the gas. But, from more recent experiences, it had been found that this was the wrong thing to do; as, by preventing the naphthaline deposits farther on, the illuminating power of the gas suffered to some extent by being absorbed by the heavy tar. With the larger hydraulics now in general use there was a greater bulk of tar below the seal, and at the end of the season it has been found that the thick tar had to be literally dug out of the hydraulic; that is to say, where a systematic overhaul was carried out.

My aim was, first, to prevent the tar in the hydraulic from getting into a have run away. The tar being of a miscible character, the tar and the liquor flow away together, notwithstanding the higher specific gravity of the former, but still leaving some liquor where required. I find also an increase in the illuminating power of the gas. I may add that the whole of the dips have been brought as nearly as possible to 1-inch seal. This has decreased the accumulation of carbon in the retorts; and, in conjunction with the prevention of the tar thickening, choked pipes, although not unknown, have been reduced in number.

In the illustration fig. 3 is a new form of hydraulic main, which might be useful in effectually drawing the tar to the lowest point as it leaves the hydraulic.

In conclusion, I have only to say I regret the meager character of what I have put before you, but I trust that it may lead to some useful remarks, and that on a future occasion some abler person may bring to your notice further experiences in this direction, and demonstrate the advantages arising from removal of the heavy tar from the hydraulic main.

Discussion.

The President, in inviting discussion on the subject of the paper, said he hoped there would be that freedom of speech which he had ventured to shadow forth in his address.

Mr. H. Cockey (Frome) said that in his address to the Association last year he had introduced the subject treated by Mr. Durkin in his paper, and referred to the state of things in existence at Frome; explaining in a great measure the system that had been adopted there. He found on further experience that the system worked very well, and he thought it was a valuable one to adopt. In his experience the system entirely did away with choked ascension-pipes, and he was sure the illuminating power of the gas was increased by it. There was no difficulty in connection with the system. After a long period of working he had the hydraulic opened, with the view of ascertaining whether the arrangement was perfect, and found the main entirely free from tar; and therefore he could say with confidence that this was a valuable and useful arrangement. The plan of separating the hydraulic into sections might be alluded to in connection with the subject, and he could speak very highly of it. In some works there was a separate section of hydraulic to each bed of retorts; and, amongst other advantages, this plan altogether got rid of troubles arising from alteration in the depth of seal.

Mr. J. J. Jervis (New Swindon) remarked that for the last six months or so he had been using Mr. Cockey's arrangement for taking off the tar from the hydraulic; but he had not found it a complete cure for stopped ascension-pipes, for a few weeks since he was obliged to have two pipes taken down and burnt out. Perhaps one cause of this was because the pipes were too short. It was very well to take off the tar from the bottom of the main; but in his opinion still greater advantages might be gained by getting a continuous flow or current of fluid through the hydraulic. He had a small injector, and this was put into operation every day, and made to throw a stream of warm water into the hydraulic for about 20 minutes; and if he adopted Mr. Durkin's idea, and threw up warm liquor instead of warm water, he believed he would then have all that could be desired. He should add that during the past winter he had nothing like so many choked pipes as was the case before Mr. Cockey's arrangement was fixed, and perhaps the fault of his apparatus was not altogether in the hydraulic.

Mr. W. W. Monk (Bournemouth) agreed that it was important to remove the tar from the bottom of the hydraulic; but said he would like to ask Mr. Durkin if in his opinion the tar had a greater tendency to flow through the pipe shown in the drawing than through the valve in the ordinary arrangement. In his opinion the best cure for stopped ascension-pipes was to put plenty of coal in the retorts. If one retort was hotter than the others, his advice was, "Put more coal into it."

Mr. A. Edwards (Taunton) said no particular apparatus could be expected to produce similar results in every case, and no doubt there were other reasons which might account for Mr. Jervis's choked pipes. At Taunton he never had a choked pipe, although he did not use any special apparatus. He had a separate hydraulic for each setting, and no doubt there was a great advantage in this plan, and any gas manager who happened to be altering his hydraulic main should not fail to put this in practice. But sometimes too much stress was laid on particular points. A separate hydraulic main for each setting was a very good thing in itself; but if it was put close down on top of the retort bench (which might be nearly red hot) the main might be expected to fill up with pitch. Care must always be taken that the bottom of the main was a sufficient distance above the top of the retort bench. No doubt matters might be improved by the use of some apparatus of the kind described by Mr. Durkin. Everyone knew that it was essential, if there was tar in the hydraulic, to keep it in motion. When there was only one outlet for it, the passage of the gas would keep it in motion; but where there were two outlets this would not be the case. The hydraulic ascension being close on the top of the retort bench would account to some extent for Mr. Jervis's thick tar in it.

Mr. Jervis remarked that his hydraulic was not over the bench at all, but was supported by columns in front of the retorts.

Mr. T. Hardick (Salisbury) had for some time watched the progress of the subject under discussion, and thought that the plan proposed was a move in the right direction. He had found choked ascension pipes to arise from the smallness of the pipes provided for carrying the gas away from the hydraulic. When he first went to Salisbury, many years ago, they had as many as 23 choked pipes in a day, with a make of only 5,000 cubic feet per ton. On examining the benches and pipes he found that the whole of the make, from 63 retorts, had to pass through one 5-inch pipe. This pipe was heated by close proximity to the retort bench, and he found it partly corroded, and to such an extent that the clear way through it was not more than 3½ inches in diameter. He had it removed and replaced by larger pipes, putting in larger connecting pipes at two or three other points; and from that day had had no more trouble with choked pipes. He believed that chokes were frequently caused by the rapid manner in which the gas had to pass from the hydraulic, and this accounted for the advantage of having a separate outlet for each setting. If they had plenty of outlet room they would do away with chokes.

Mr. Monk remarked that sometimes the kind of coal used made a difference.

Mr. H. G. Crowe (Wellington) said that if his ascension-pipes were never choked he should look anxiously to his heats. His works were small, and his hydraulic was divided into sections—one to each five retorts. During last winter he had great trouble with the ascension pipes of one particular set of five, the remainder being clear. His retorts were round ones (15-in.), and they were charged every six hours with 2 cwt. of coal, which was sufficient to well fill the retorts. The heats were so good that he could have worked off this quantity of coal in five hours, if required. The ascension-pipes were 5 inches in diameter. He had so much trouble with this particular set that he let them down, and took up some more retorts. The remark that a good charge would help did not seem to be borne out in his case, and he should be thankful for any information that would assist him.

Mr. Edwards said Mr. Crowe's remark, to the effect that if there were no choked ascension-pipes there must be something wrong with the heats, did not apply to him. His retorts were 21 in. by 14 in. and 9 feet long, and he worked one-third small and two-thirds large Silkstone coal, using high heats, and obtaining 10,400 cubic feet of gas per ton, and 7,000 cubic feet per mouthpiece. There would be no need to have stopped pipes if the hydraulic were made in separate sections; and they were evidence either of bad engineering or bad management. It was impossible to get good results without the proper apparatus.

Mr. W. Osmond (Dorchester) said he had found not only one setting, but one particular retort liable to be constantly choked. In some cases a great deal of this had arisen from not properly cleaning the ascension-pipes; but he did not think stopped pipes were due entirely to bad engineering or bad management.

Mr. H. Sainsbury (Trowbridge) could bear out the remarks of the previous speaker. When the retorts were blown, the ascension-pipes were, he said, almost on fire, and no doubt some tarry matter was burnt on to them, and the men did not always thoroughly clean them out.

Mr. Crowe said that to get rid of this very thing he had lengthened the mouthpieces and widened the saddles at the top of the ascension-pipes, thinking that the closeness of the pipes to the brickwork might have been the cause of the chokes. He had personally seen that the pipes were thoroughly cleaned. It was very well to say that stopped ascension-pipes could easily be disposed of; but he should be glad to be able to escape from them. When he had proper heats he invariably had stoppages also; but when the heats were low no stoppages occurred.

Mr. Monk remarked that his predecessor had as many as 24 or 25 choked pipes in a single evening, but he (Mr. Monk) did not have such a number in six months. This was solely attributable, he said, to the use of heavy charges. He found chokes most likely to occur with the hottest retorts; and when such was the case he used a little more coal.

Mr. J. Thomas (Bodmin) had experienced a great deal of trouble, both with thick tar and choked ascension-pipes, and had adopted the plan of pumping up tar from the tar-well into the hydraulic—about three or four gallons per ton of coal carbonized per day. This liquefied the thick tar or pitch, and caused it to run off easily with the rest; thus preventing stoppages and chokes. He recommended all present to try the experiment of pumping tar back into the hydraulic from the tar-well.

Mr. Durkin, in replying to Mr. Monk, said he certainly thought the tar would flow away better in his arrangement than by the usual plan. If the liquid products of condensation flowed away through a valve in the ordinary manner, the liquor would get away first, leaving the hydraulic main full of tar. He took the heavy tar off first. Some observations had been made about stopped ascension-pipes, and he found that this system, although it greatly diminished their number, was not an entire cure. He did not know what his friend from Taunton considered a "heavy" charge; but with 16-inch through retorts he used 2½ cwt. charges—5 cwt. per retort. With this quantity of coal there was little room above it in the retort at the end of the charge. His hydraulics were not close down on the brickwork, but fixed at a good height above; but he did not think this was altogether the cause of the tar thickening in the hydraulic. In his experience the size of the ascension-pipes had very little to do with chokes. In the larger pipes the choke was a little longer about. He was in the habit of using north country coal, and believed all who used this kind were subject to stopped pipes.

Mr. T. Stone said one thing that contributed more than others to stopped ascension-pipes was unskilful charging. He had seen coal so thrown into the retort that it struck the interior edge of the ascension-pipes every time.

The President said his experience of the arrangement had been a pleasant one. Mr. Monk doubted if the tar really passed off at the bottom of the main; but he (the President) was positive that it did. He had found nothing but thick tar from the tar overflow-pipe, and he had found

liquor on the top in the main. There was great disadvantage in having the hydraulic too near the brickwork, and he kept his at least 28 inches clear above, having learnt by experience the advisability of so doing, as there was a greater tendency to choked pipes when the hydraulic was too near the bench. He found choking began at the top of the ascension-pipe, and not at the bottom as was usually supposed. In his works each bed of retorts had its separate hydraulic and its separate valve; and with this arrangement it was quite possible to repair, take out and clean, etc., without stopping the whole of the make. When the bridge valve was screwed down as far as it would go, there was at least an unsealing to the extent of half an inch; so it admitted of experiments being tried in the way of working without seal, if desired.

Refrigerating Machinery.

Mr. A. C. Kirk, M.I.C.E., recently delivered an interesting lecture before the Institution of Civil Engineers (England) on the subject of "Compressed Air and Other Refrigerating Machinery," in the course of which he called attention to the importance of refrigerating machines, briefly recounting their history from the first positive step taken in 1845, by Dr. Gorrie, of New Orleans, La., who caused compressed and cooled air to expand in working a piston in a cylinder. He then showed that no really intelligent progress had taken place until the mechanical theory of heat had been fully developed, and proceeded to illustrate a very simple proposition, namely, that every refrigerating machine was only a thermodynamic engine in which the power was negative. The machine, instead of giving out power, must be supplied with power from an exterior source to work it. An engine which gave out power received heat at a higher, and rejected a portion of it at a lower, temperature. When an engine absorbed heat at a low temperature and gave it out at a higher temperature, power must be applied to move it. In this case the engine became a refrigerating machine. This was illustrated by taking the case of air engines and steam engines and showing how, under the above conditions, each of them passed into a refrigerating machine.

The refrigerating machine represented by the steam engine belonged to the type of which the other machine was a common example. Although the ammonia machine belonged really to the same type, the absence of all apparatus to communicate motive power to it, as in the case of the ether machine, and the fact of its receiving energy directly as heat, rendered special notice of it indispensable. The lecturer then proceeded to observe that the ammonia machines resulted from the well-known experiments of Faraday, and he gave an account of the apparatus as constructed by Messrs. Mignon and Rouart. In this class of machines cold was produced by the evaporation of the volatile liquid employed in it—ether, ammonia, or other substance. In all these machines it was necessary to remove the vapor as fast as it was produced by the volatilization, or boiling, of the ether, ammonia, or other liquid; and in order that the liquid might be condensed at the ordinary temperature, it was necessary to compress it to a higher pressure in a condenser. In the ether machine this was done by a piston working in a cylinder. In the ammonia machine the same process was effected by the peculiar affinity ammonia had for water. When a solution of ammoniacal gas and water was heated, the ammonia was forcibly expelled into the condenser where it was liquefied, thence passing to the evaporator it boiled, and cooled whatever substances were exposed to it; and this vapor was instantly again compressed by bringing it into contact with cold water. The same change of temperature of the water from hot to cold performed a similar function to the piston, when it moved backwards and forwards in the cylinder of the ether machine. In the air machines, on the other hand, the air was compressed and cooled as far as the cooling water available would allow, after which it was permitted to do work on a piston in a cylinder, and in proportion to the amount of work it did, the greater cold it produced.

The lecturer then proceeded to describe a machine of his own invention, which had been laid before the Institution in 1874. In this machine the theoretical conditions of a perfect air engine were very nearly fulfilled. The regenerator—an invention of Dr. Stirling's—performed the same function that adiabatic expansion and compression performed in Carnot's perfect air engine. Indeed, Stirling's regenerator might, in theory, be held to furnish as perfect a cycle as Carnot's. He next showed that the application of the regenerator was limited to the case of dry air; otherwise at temperatures below freezing it would get closed up by snow. He briefly alluded to a variation of the above machine, in which the cooling water and the brine which had to be cooled were both injected directly into the compressed and expanding air. The brine in this case washed the regenerator, and prevented the formation of snow. The last type of refrigerating machine alluded to was also an air machine, but in this machine the air which acted as a cooling medium inside the machine was discharged directly into the chamber to be cooled. Tracing the history of these from the earlier attempts of Professor Piazzi Smyth, Professor Rankine, and Sir William Thomson, he observed that its first introduction on a practical and efficient scale was due to Mr. Coleman, who applied it to the cooling of chambers for the preservation of meat. The only question of practical difficulty attending this machine was the production of snow—a difficulty which had not been entirely overcome. The machines in use were of two kinds; one, in which the compressed air was cooled by the injection of water; the other in which it was cooled by coming into contact with cold surfaces, like the surface of the condenser of a steam engine. He showed that in the latter case, when the machine had for a little time drawn air out of the chamber and cooled and returned it to the chamber, the store of moisture in the air would be exhausted and snow cease to be formed. He then described, in some detail, the arrangement of one of Mr. Coleman's machines, working by injection, and observed that where injection was used the power required to compress the air was reduced. On the other hand, when it was not used less snow was produced; and in docks and rivers the bringing of foul and tainted water into contact with the air which had to be passed over the meat was avoided. But where dry compression and cooling were adopted it was necessary to use oil in the compressing cylinder. Noticing Mr. Lightfoot's invention, where moisture was deposited by a partial expansion, he showed the important part which the interchanger played in all these machines. By that means, instead of the compressed and cooled air entering the expanding chamber, possibly at 90°, being cooled from that to 40°, and sent out of the chamber again at 30°, cooling might be made to commence almost from the temperature at which the air escaped from the chamber, the cold air coming in from the chamber cooling the air previous to expansion. The effect of this was to reduce the amount of compression or expansion necessary, or to put it in other words, to reduce the size of the machine, and consequently the power required to work it. The interchanger further played the important part of condensing a portion of the moisture contained in the compressed air, and bringing the snow formed within manageable limits.

The leeturer then noticed some of the applications of these machines, and first, ice-making. Detailing the result of his experiments, he showed that the essential condition of making hard and clean ice was that the surfaces of ice while freezing should not get nearer than within a few inches of each other, as, when the reverse happened, amorphous crystallization ceased, and by mutual attraction the crystals of ice shot like long spikes through the water to meet each other, and these interlacing were the cause of spongy and rotten ice. He next illustrated the process of cooling paraffin, which was, as far as he knew, the first application of a refrigerating machine to manufactures. Paraffin being a bad conductor of heat, had to be cooled in thin films; this difficulty he overcame by making a drum revolve, which was kept cold by the machine, with its under surface dipping slightly into the solution of oil and paraffin intended to be cooled. A thin coating adhering to the drum, by the time it had made nearly a revolution, became sufficiently cool, and was then removed continuously by a scraper and ready to be taken to the press, so that the oil might be extracted, and the solid paraffin obtained from which the finest candles were made. Glancing at its important application to breweries, the last subject the lecturer elucidated was the process of preserving meat by freezing it. The late Mr. Mort, of Sydney, gave much attention to this subject many years ago, but nothing practical came of it, at least so far as the importation on board ship went, until Mr. Coleman applied the direct method of cooling air. On long voyages from Australia, meat was frozen quite hard; in fact, much of it was at a temperature many degrees below zero. Meat brought from America, however, did not require to be actually frozen. He showed that it was in every way preferable to use a small quantity of air, cooled to a very low temperature, than a large quantity cooled to a less temperature, as it led to the reduction of the space occupied on board ship, the size and friction of the machinery were diminished, and the very cold air, by its greater density, assisted to maintain the requisite circulation amongst the closely-packed cargo of meat with which the ship's hold was filled.

In conclusion, the lecturer gave some statistics of the extent to which this meat trade had grown during the last five years. By the use of Mr. Coleman's machine alone (he had not been able to find out how much had been imported by other machines), 563,568 quarters of beef and 113,633 carcases of mutton had been imported from America. By various machines during the last four years there had been imported from Australia 3,159 carcases of beef and 138,664 carcases of mutton; while from New Zealand the last two years, 728 quarters of beef and 129,732 carcases of mutton had been imported. In the months of January and February this year, there came from Australia and New Zealand 69,663 carcases of mutton. These figures might be taken to represent a gross value of nearly 3,500,000 pounds sterling, besides which a considerable quantity of meat had been imported from the River Plate. He pointed out that each machine had its own proper use in this country. For such purposes as making ice the ammonia machine would perhaps be most largely used; while abroad, where supplies of chemical sub-

stances were apt to fail, and were at all times very expensive, machines producing cold by the expansion of air would be found preferable. On the other hand, where water power could be had, the air machine and apparatus after the type of the ether machines, were the only ones applicable. On board ship the air machine was the only suitable one.

It will be noted that Mr. Kirk concedes superiority to the ammonia machine for the manufacture of artificial ice, and it can be merely but a question of time when the demand for ammonia, in this and other kindred operations, will tax the gas maker's ability to supply the calls made upon him for ammoniacal liquor. Indeed, more particularly in the hotter sections of the United States, it would seem to be inevitable that the period must soon be reached when it will be found more profitable by far to work the liquor up than to pursue the present system of disposing of it in bulk.

Rights of Fuel Gas Companies in Allegheny County, Pa.

In our issue of April 2d, of current year, we made mention in our "Item" columns of a decision rendered by Judge Stowe in regard to a protracted legal battle between the "Fuel Gas Company" and the "Penn Fuel Company," the animus of the controversy being as to which of the two above-named corporations should have the right to supply natural gas for *heating* purposes to those desirous of using the same, within the limits of Allegheny County, Pa. The press despatches, announcing the termination of the case through the promulgation of Judge Stowe's decision on the merits of the matter, were somewhat vague, and we ventured to ask Mr. John H. McElroy, of the Pittsburgh Gas Company, for some further particulars. These were very kindly forwarded to us by that gentleman some time since, but owing to the pressure on our columns we have hitherto been unable to reproduce them. Mr. McElroy himself vouches for the correctness of the details given below, and a perusal of the same will show just how the matter stands.

At the instance of the Fuel Gas Company the proper authorities, some time ago, commenced proceedings against Edward O. Emerson and others, comprising the Penn Fuel Company, upon a *quo warranto*, to revoke the charter of the latter company on the ground that, under the incorporation act of 1874, the company first chartered, which is the Fuel Gas Company, has the exclusive right to do business in Pittsburgh until it shall have declared five 8 per cent. dividends. The claim is sustained by Judge Stowe, who decides that the Fuel Gas Company of Allegheny County has the exclusive right to supply the public in the city of Pittsburgh with heat from either natural or artificial gas, until it shall have declared five 8 per cent. dividends, and that the alleged charter which the Governor granted to the Penn Company is null and void, and should be revoked.

Messrs. D. T. Watson and James P. Brown represented the Commonwealth, and George Shiras, Jr., and C. C. Dickey the defendants. The stockholders of the successful company are R. B. Brown, Geo. Trautman, H. Sellers McKee, W. H. Alldred, Stewart McKee, David Hostetter, and Horace Mayn, of Philadelphia. The bulk of the stock is held by H. Sellers McKee, R. B. Brown, and Geo. Trautman. The President of the company is R. B. Brown, and the Secretary and Treasurer D. Herbert Hostetter. The Penn Fuel Company, the defeated corporation, is composed of J. N. Pew, E. O. Emerson, Hilary J. Brunot, M. O. Haymaker, J. Johnson, and the majority of the stock is held by Messrs. Pew and Emerson, the former b ing President and the latter Secretary and Treasurer.

OPINION OF THE COURT, DELIVERED BY HONORABLE JUDGE STOWE.

According to the undisputed evidence in this case, on the 19th and 26th of August and 2d of September, 1881, in the regular edition and issue of the *Evening Chronicle* and Pittsburgh *Telegraph*, two public newspapers published in the city of Pittsburgh, county of Allegheny, the following notice was printed and published, to wit:

"Notice is hereby given that application will be made to His Excellency, Henry M. Hoyt, Governor of the Commonwealth of Pennsylvania, for a charter of incorporation of the Allegheny County Fuel Gas Company, in accordance with the provisions of the act of Assembly passed April 29, 1874. The character and objects of said corporation is to manufacture and supply fuel gas in the county of Allegheny.

"H. & G. C. BURGWIN, Attorneys for Applicants."

Under and in alleged pursuance of said notice and act, 29 April, 1874, M. A. Arnholt and others, on the 19th day of January, 1882, filed in the office of the Secretary of the Commonwealth articles of association for the purpose of the procuration of a charter and the incorporation of a company to be known by the name of the Fuel Gas Company of the county of Allegheny, and stating therein that the purpose of said corporation was the "supply of heat to the public within the city of Pittsburgh from gas." The Governor approved the said application, and in due form of law letters patent were issued to the Fuel Gas Company of the county of Allegheny on the 19th of January, 1882. Subsequently, on the 24th day of February, 1882, the Governor, after the ordinary notice and preliminary steps required by said act of Assembly, granted and issued to Edward O. Emerson and others, the defendants in this suit, a charter of incorporation, under the name of the Penn Fuel Gas Company, the business of which was to be conducted in Pittsburgh, county of Allegheny, and the purpose whereof, as set out in their application to the Governor, was "supplying *heat* to the public within the city of Pittsburgh by means of natural gas conveyed from some point or points within the county of Allegheny and adjoining counties, as may be convenient."

The Fuel Gas Company proceeded with reasonable diligence, and laid pipes for the purposes of carrying on their business, as set out in their charter, in the city of Pittsburgh, and have been gradually extending them over the city. As yet no dividends have been declared or earned by the company.

It was admitted on the trial that several acts of Assembly had been passed and were now in force, incorporating gas companies, viz.: An act to incorporate the Pittsburgh Gas Company, passed in 1848, see P. L. 1848, page 213; an act to incorporate the Consolidated Gas Company, passed in 1872, see P. L. 1872, page 1309; an act to incorporate the Monongahela Gas Company, passed in 1872, see P. L. 1872, page 621; an act to incorporate the East End Gas Company, see P. L. 1869, page 711; and a supplement to the act incorporating the Pittsburgh Gas Company, passed in 1869, see P. L., page 817.

The General Act of March 11, 1857, to provide for the incorporation of gas and water companies was also referred to. It was also admitted that the several companies whose charters had been offered in evidence were duly incorporated and done business under their charters prior to the act of 1874. It was shown that companies organized under these acts had furnished quite a number of the citizens of Pittsburgh with *heat from gas*, as well as light. There was also evidence admitted showing that gas was made from coal under what is known as the "Siemens process" for heating purposes, by converting it into gaseous material, and that the process has been used by Park Bros.' steel works, in Pittsburgh, for a long time (ten years at least), and that this process was patented. It was shown that the Penn Fuel Gas Company had paid $120 to State Treasurer, on account of bonus on charter, February 28, 1883; December, 1883, $35 for filing election return and certificate of increase of capital stock to Deputy Secretary of Commonwealth, and December 18, 1883, $35 for fee for filing election return and certificate of indebtedness, to Deputy Secretary; and that the defendant company had expended between $200,000 and $300,000 in carrying out the purposes of the charter, about one-third of which was in the city of Pittsburgh. The Fuel Gas Company also showed that it had paid its proper bonus on charter and taxes.

Under the foregoing state of facts, none of which were controverted, the Court was requested to charge the jury on the part of the plaintiff—

First—That the Commonwealth having, on January 19, 1882, issued letters patent to the Fuel Company of the county of Allegheny for the supply of heat to the public, from gas, within the city of Pittsburgh, under the act entitled "An act to provide for the incorporation and regulation of certain corporations," approved April 29, 1874, no other company could under said act be incorporated for that purpose, until the said Fuel Company had, from its earnings, realized and divided among its stockholders during five years a dividend equal to 8 per centum per annum upon its capital stock.

Second—Under the said act, approved April 29, 1874, neither the Governor nor Secretary of the Commonwealth could, on February 22, 1882, or subsequent thereto, issue to the Penn Fuel Company a charter for the purposes for which its pretended letters patent were issued.

Third—Under all the evidence the plaintiff is entitled to your verdict.

The defendants requested the Court to charge the jury—

First—That the letters patent and charter put in evidence by the defendants make a *prima facie* case, and the plaintiffs have not shown any facts overcoming said *prima facie* case, and the verdict of the jury should be for the defendant.

Second—That under all the evidence *pro et* same, the plaintiff is not entitled to recover, and the verdict should be for defendants.

All these points were reserved, the Court saying to the jury: "We instruct you for the present that the plaintiff has a right to your verdict, reserving, however, the question as to the right of the parties under the pleadings and evidence (none of which is controverted by either party) for further consideration. And therefore a verdict was rendered for the plaintiff, subject to the opinion of the Court upon the question of law reserved."

It cannot apparently be denied that if the Fuel Gas Company has a valid charter, and the clause of the act of Assembly under which it was granted, giving it the exclusive right in such cases to have and enjoy the franchises and privileges of such incorporation, to wit: "To supply *heat* to the public by gas within the city of Pittsburgh," is constitutional and valid, the Governor had no right to incorporate the defendant company, and judgment must be entered against it. The questions thus presented are of great im-

portance, and we apprehend can be satisfactorily decided by the Supreme Court only; and to accomplish this end the cause has been put in its present shape.

After a careful consideration of these matters we, however, have come to the following conclusions:

First—That the act of April 29, 1874, authorizes the incorporation of companies for supplying *heat* from natural gas, such as was granted to the Fuel Gas Company January 19th, 1882.

Second—That the restriction imposed by clause 3 of section 34 of the act of April 29, 1874, that "the rights to have and enjoy the franchises and privileges of such incorporation within the district or locality covered by its charter" (to wit, city of Pittsburgh) "shall be *an exclusive one*," is not legally an objectionable one as falling within the rule appertaining to monopolies, and is therefore constitutional; and

Third—That the objections raised by defendant, in regard to the alleged irregularities as to notice in procuring the charter of the Fuel Gas Company, are not such as will justify us in holding the charter to be illegal and void, even admitting *pro tempore* that such objections can properly be raised in this proceeding.

These views, if correct, settle the question as to defendants' rights under their charter so far as they are involved in this case, and make it our duty to order that judgment be entered, that defendants be ousted and altogether excluded from all franchises, privileges, and powers set up and claimed to be in them by reason of the charter or letters patent granted them, the said Penn Fuel Company, by the Governor of Pennsylvania on the 22d of February, 1882, and the defendants pay the costs, which is now ordered to be done upon payment of the verdict fee.

An Apparatus for Detecting Gas Leakages.

C. von Jahn describes, in the *Revue Industrielle*, an instrument that he calls an indicator of gas leakages. The apparatus consists of a porous earthenware vessel, similar to the porous cell of a galvanic battery, set upside down and closed through the intervention of a perforated india rubber stopper. By means of the perforation in the stopper the interior of the vessel is connected with a pressure gauge containing a small portion of colored water. The apparatus can be exposed to the air of an apartment where a leak of gas is suspected, or a sample of the air may be contained in a bell glass inverted over the porous cell. The diffusion of gas through the earthenware raises the level of the water in the pressure-gauge, and when the latter is properly graduated and proportioned to the capacity of the cell exact and delicate indications may be obtained in a simple manner. This species of diffusiometer is so sensitive that when an Argand burner is gradually turned down until it is extinguished, the instrument, if held above the burner, will show a considerable rise of the water in four or five seconds. If held over an ordinary burner, turned on just sufficiently to be ignited, the liquid rises very rapidly. When the instrument is graduated in millimeters a volume of $\frac{1}{2}$ per cent. of gas in a room may be distinguished by it. An example is afforded by a case of sickness, which in the opinion of the medical attendant, was due to gas poisoning. Some doubt arose on the point, because gas was not laid on to the house. The diffusiometer was brought into requisition, and showed the presence of gas, the source of which was afterward found in a broken main 3 m. distant from the house. A modification of the same instrument is made whereby the sensitive portion is adapted for permanent exposure in any place difficult of access, such as the ceiling of a theater or public building, where gas might be expected to collect, the indicating portion being fixed anywhere within view.

[The same ends would seem to be much more readily accomplished by a slight modification of the apparatus of Herr C. von Than, which instrument was illustrated and described in Volume 38 of the JOURNAL, issue of May 2, 1883.—ED.]

Presence of Lithia in Ohio Fireclays.

Professor N. W. Lord, of the State University of Columbus, Ohio, read, at the Cincinnati (February, 1884) Meeting of the American Institute of Mining Engineers, a "note" on this subject. He said that having had occasion to institute and bring to completion a series of analyses of fireclays for the Ohio Geological Survey, he found that the amounts of potash and soda, determined indirectly by measuring the chlorine volumetrically, did not "check" with those obtained directly. Investigation with the spectroscope showed the presence of lithia in what seemed very appreciable quantities. The examination was made of a considerable number of samples, and in every case this element was found, though in varying amounts, as judged by the intensity of the spectrum.

To guard against error from the impurity of reagents, the whole process was repeated, using the same reagents in corresponding amounts, but leaving out the clay. In no case did these "blanks" show lithia; hence the presence of this element in the clays seemed to be established conclusively. In the same series of analyses, titanic acid, in amounts varying from three-tenths to nearly two per cent., was found. The presence of titanium was first observed in the Ohio clays, nearly three years ago, in the examination of clays from Logan. The occurrence of this element is, of course, not unusual in clay, and we believe that none of the published analyses of Ohio clays gave it; certainly none of the former Ohio geological reports speak of its presence.

The following analyses show both of the above ingredients. They were made during the summer of 1883.

	1.	2.	3.
Combined silica	39.03	37.92	29.22
Quartz sand	15.50	13.80	31.34
Alumina	27.88	30.10	24.97
Oxide of iron	2.41	1.94	1.66
Lime	0.42	0.62	0.63
Magnesia	0.68	0.53	0.40
Titanic acid	1.26	1.85	1.30
Potash	3.31	2.74	0.28
Soda and lithia	0.12	trace	trace
Combined water	8.17	9.95	8.90
Moisture (at 100° C.)	.76	1.05	1.69
	100.66	100.50	100.39

Overhead Wires.

The *Scientific American*, in making a suggestion as to this vexed matter, asks, What shall be done with the wires which, like threads of a huge web, hold the New York streets in a mesh-like tangle? and adds the opinion that this is a question as perplexing as it is important. In proposing a plan whereby the evil might in some measure be abated the writer notes the fact that the New York City Board of Aldermen says that such wires as pertain to electric lighting plants must be buried after May, 1885; one branch of the legislature says that both electric light and telephone wires must be under ground by June 1, 1885, in cities of 50,000 inhabitants or over. Lastly, the sub-committee appointed by the representatives of the electrical companies, exclusive of Western Union, after considering the subject for several months, have decided that wires of all descriptions should go underground, and suggest that the municipality provide suitable subways for their reception. Singularly enough, neither the legislative investigating committee nor yet that appointed to represent private interests considered what would seem to be by far the most important point bearing upon the subject in hand, viz., the convenience of the general public.

No reasonable person will deny that electric mains carrying powerful and dangerous currents should be placed out of reach. But telegraphic and telephonic wires are dangerous neither to life nor property, and so far as they are concerned the question would seem to be: Is their unsightliness and the annoyance attendant upon their repair of more importance to the general public than the additional expense of their use which it is but reasonable to look for when the costly subways and tunnels shall have been built?

If the telegraph and telephone were only for the rich, that is, for the few, it would be neither surprising nor illogical if the many should object to the invasion of the streets and the roofs of their houses. But such is not the case. Both services have become generally popular, and already so much used as to have become almost a necessity.

So far as the telegraph is concerned, the public is looking forward to a very decided reduction in the rates, and, considering the conditions under which the service is performed to-day, there seems to be no reason why they should not be gratified. But if no one is willing to be the least inconvenienced for the sake of the general welfare, if no one is willing to have a wire pass his door or cross his roof, he may not reasonably expect at the same time to have a cheap service.

It is much the same with the telephone. Increase the expenses of the companies, and you force them to increase their rates for service. This tends, as a natural consequence, towards limiting its usefulness, for no matter how convenient it may be in the transaction of the ordinary affairs of life, it cannot, if it be expensive, be popular.

If a man objects to the clatter of the milk wagon and the baker's wagon before his door, he can, if he does not mind the additional expense, have his milk and bread brought to him by hand. It would be manifestly unfair and unreasonable to expect that his less fortunate neighbors should incur a like expense that he might not be disturbed. Equally absurd would it be, should he expect his milkman and baker to go to the additional trouble of serving him by special messenger at the same rates, and still worse, to even demand a reduction in these. The fact is, every one should be willing to sacrifice something for the general welfare. With this view, it would seem as though a plan might be devised by which the telegraph and telephone

wires could be systematically led over the roofs of the houses, without proving a special hardship or annoyance to anyone; and we must confess it seems somewhat surprising that no such plan has, so far as we know, been considered. There is good reason to believe that, with proper supervision by constituted authorities, the general and indiscriminate scrambling over roofs, now indulged in by line men, could be avoided in great measure. The unsightly street poles could be done away with, and the wires now strung on them be laid in the same order over roofs of houses. When damage of any kind resulted, such as injury to a chimney or roof, those who had general supervision over all the wires could readily decide who was responsible for it, and hence who must repair the injury done.

Nor is it by any means certain that the construction of subways through the main thoroughfares would, though increasing cost of service, abate the alleged nuisance of stringing the wires over the houses. Telephones and burglar alarms are usually run over the tops of the houses and across the yards and courts, and unless all the side streets, as well as the avenues, were undermined, and so unnecessary and costly an undertaking has not, we believe, even been contemplated, there would be little or no diminution in the number of wires crossing the roofs.

In the plan we have suggested, the telephone and telegraph wires could readily be kept apart, as indeed could the lines of the various companies.

What most commends this plan is its cheapness and convenience, which characteristics, if we mistake not, are the essentials to every scheme in which the general public is looked for to take part.

The public demands cheap telegraph and telephone service, and that this may be had by any of the recent plans to sink the wires, we must in candor confess there are grave doubts.

Awards Made by the Jurors in the Gas Section of the Crystal Palace International Gas and Electric Exhibition, 1882-3.

The awards made by the Jurors in the Gas Section of the International Exhibition, held at the Crystal Palace last year, have recently been made public, and are as follows:

Gas Burners.

Recuperative—

Gold Medal for the Grimston regenerative gas burner. (Exhibited by G. Bower.)
Gold Medal for F. W. Clark's regenerative gas burner. (Exhibited by the Portable Gas Apparatus Co.)
} Equal.

Multiple Argand—

Silver Medal for Sir James N. Douglass's burner. (Exhibited by the Improved Gas and Oil Burners Co., Limited.)
Silver Medal—William Sugg & Co., Limited.
} Equal.

Flat-Flame, with Governors—

Silver Medal—William Sugg & Co., Limited.

Flat-Flame in Lanterns—

Silver Medal—William Sugg & Co., Limited.

Incandescent Burners—

Silver Medal for the Clamond burner. (Exhibited by E. Servier.)
Silver Medal for the Lewis burner. (Exhibited by G. Bower.)
} In recognition of novelty of principle.

Silver Medal—Albo-Carbon Light Co., Limited, for their method of increasing the illuminating power of gas.

Cooking Stoves.

Silver Medal—H. and C. Davis & Co.
Silver Medal—J. Wright & Co.
Silver Medal—General Gas Heating & Lighting Co., Lim.
Silver Medal—Waddell & Main.
} In order of merit.

Silver Medal—Strode & Co., for their summer and winter stove. (This stove is also applicable, for heating purposes, as a reflector stove.)

Close Heating Stoves.

Silver Medal—John Wright and Co.
Silver Medal—General Gas Heating & Lighting Co., Lim.
Silver Medal—William Sugg & Co., Limited.
} In order of merit.

Open Heating Stoves.

Asbestos Fuel Stoves—

Silver Medal—West Brothers.

Tile Stoves—

Silver Medal—General Gas Heating and Lighting Co., Limited.

Reflector Stoves—

Silver Medal—Strode & Co. (see above), for summer and winter stove.

Instantaneous Water Heaters.

Silver Medal—William Sugg & Co., Limited, for Therma heater.
Silver Medal—Strode & Co.
} In order of merit.

Gas Governors.

Silver Medal—James Stott & Co.

General Awards.

Diploma of Honor—George Glover & Co., for the general excellence of their exhibits.

Diploma of Honor—W. Parkinson & Co., for the general excellence of their exhibits.

Silver Medal—Pintsch's Patent Lighting Co., Limited, for their gas apparatus.

Silver Medal—Thompson's Smokeless Kiln and Oven Co., Limited, for their kiln.

Silver Medal—The Portable Gas Apparatus Co. (F. W. Clark), for their apparatus for the manufacture of gas.

Silver Medal for Fletcher's apparatus for the application of gas to heating purposes. (Exhibited by Deane & Co.)

(Signed)

Douglass Galton, late Captain R.E., C.B., D.C.L., F.R.S.
Robert Harris, Memb. Inst. C.E., Engineer to the Gas Light and Coke Company.
W. J. Russell, Ph.D., F.R.S., Professor of Chemistry, St. Bartholomew's Hospital.
} Jurors.

Lighting Apparatus of the Eddystone Lighthouse.

Mr. W. Tregarthen Douglass, in the course of a very exhaustive paper on this "monarch" of lighthouses (read before the Institution of Civil Engineers, England), gave the following interesting particulars regarding the working of a portion of the lighting apparatus. The author described the lantern as being of the cylindrical helically-framed type adopted by the Trinity House, a description of which has already been submitted to the Institution. The glazing is 2 feet 6 inches higher than usual for first-order lights, this additional height being necessary to meet the requirements of the special dioptric apparatus. The flag-staff is fixed in a hole cut through the lantern-gallery, and in a gun-metal guide at the surface of the tower below. At night the flag-staff is lowered by a winch, with which it is provided, so that its truck is below the level of the beams of light issuing from the lantern. For the white fixed light exhibited from the three lighthouses of Winstanley, Rudyerd, and Smeaton at the Eddystone, the Trinity House determined on substituting, as a distinction for this important station, a white double-flashing light at half minute periods, showing two successive flashes, each of about three and a half seconds' duration, divided by an eclipse of about three seconds; the second flash being followed by an eclipse of about twenty seconds. It was also determined to show from a window in the tower, 40 feet below the flashing light, a sector of white fixed light, covering a dangerous shoal called the Hands Deeps, which bears north-west from the lighthouse at a distance of 3½ miles. It was further determined that a large bell should be sounded during foggy weather, twice in quick succession every half minute; thus assimilating the character of the sound-signal to that of the light. Two bells of 40 cwt. each are mounted at opposite sides of the cornice, in order that a windward bell may be sounded during fog.

The optical apparatus of the main light consists of two superposed tiers of lenticular panels, twelve in each tier. The section of these lenses was designed by Dr. John Hopkinson, Member Institute Civil Engineers, in 1880, for the Anvil Point lighthouse on the cost of Dorsetshire. Each lens-panel subtends a horizontal angle at its foci of 30°, and a vertical angle of 92°, being 47½° above the central plane of the lens, and 44½° below it. Each lens-panel is composed of a central lens and thirty-nine annular rings or segments, there being twenty-one above and eighteen below the central lens. The twelve panels in each tier are fitted together so as to form a twelve-sided drum, each lens having its focus in a common center at a distance of 920 millimeters. These lenses subtend the largest vertical angle of any yet constructed for coast-illumination, the increased angle and consequent additional power being obtained by the adoption of heavy flint glass for the six highest and for the three lowest rings of each panel. The relative efficiency of this section of lens and that of the old section is 88 to 70 nearly, and its effect is only about 12 per cent. less than that of the old apparatus composed of lenses with totally-reflecting prisms above and below it. Various combinations of superposed optical apparatus have been employed in the lighthouses of this country since the application of Faraday, in 1843, of ventilating tubes to each lamp, for conveying to the cowl of the lantern the products of their combustion. In 1859 Mr. J. W. D. Brown, of Lewisham, proposed superposed

lenses for signal and lighthouse lanterns, with a separate light for each tier of lenses. In 1872 Mr. John Wigham, of Dublin, proposed superposed lenses for lighthouses, and the first application of these, in conjunction with gas-flames, was made by him in 1877, at the Galley Head Lighthouse, on the coast of County Cork. In 1876 Messrs. Lepaute and Sons, of Paris, appear to have made successful experiments with superposed lenses, and the mineral oil flames of one to five-wick lamps, the results of which were given by Mr. Henry Lepaute, Jr., in a paper contributed to the Congress at Havre in 1877, of the French Association for the Advancement of Science. Messrs. Lepaute and Sons also exhibited an apparatus of this kind at the Paris International Exhibition of 1878. The Eddystone represents, however, the first practical application of superposed lenses of the first order with oil as the illuminating material. Access to the burner is obtained, as in all recent first-order lights of the Trinity House, by a door in the large circular pedestal, and a manhole in the lamp stage, so that entire control of the manipulation of the lamp or lamps is exercised by the lightkeeper without the usual stoppage of the rotation of the apparatus, and consequent interference with the distinctive character of the light. The lantern and optical apparatus were constructed by Messrs. Chance Bros. and Co., of Birmingham.

The flame of a six-wick "Douglass" burner, with an intensity of 720 candles, is placed at the common foci of each tier of lenses. For these burners others of seven wicks will shortly be substituted, having an intensity of 950 candles. The ventilation of the upper burner is provided in the usual manner, by an iron funnel carried up the ventilating shaft of the lantern, with a regulating damper. For the ventilation of the lower burner the funnel is divided into three branches, and these are carried up inside the upper lenses, to the same level as the funnel of the upper burner. Each branch is flattened where it passes the upper lenses, thus reducing to a minimum the obstruction of the light in its passage from the burner to the lenses. It will be observed that the small obstruction of light thus incurred might be avoided by carrying the flues from the lower burner upwards on the outside of the upper tier of lenses, and in the dark spaces between the beams sent from the lenses. This arrangement would probably be necessary with an apparatus composed of three tiers of lenses, to avoid the high temperature created inside them. It was, however, considered preferable in this instance to obviate the further complication of the apparatus that would have been incurred.

As the first application of the improved burner of Sir James Douglass to a coast lighthouse of the first order was effected at the Eddystone, a description of this burner is desirable. The invention consists in surrounding an ordinary deep-chambered Argand, or a concentric-stepped Argand burner for oil or gas, with two or more concentric deflectors, these deflectors being so arranged, in conjunction with a deflecting glass chimney, as to force, in successive stages, the outer flame or flames on to the inner flame or flames, thus condensing them to the utmost extent, and also deflecting on to the external and internal surfaces of each ring of flame the whole of the ascending currents of air. The initial temperature of the flames is thus considerably increased by the condensation, and the temperature of the ascending currents of air is raised in their passage through the burner to the flames; perfect combustion being consequently produced with a maximum intensity of the light, and a mimimum consumption of the illuminating material. With this burner no adjustment of the shoulder of the glass chimney is required, as usual with concentric Argand lighthouse-burners; consequently no alteration is made in the position of the zone of light of maximum intensity, which is generally adjusted to the optical apparatus for direction to the sea-horizon. By the arrangement of the currents of air through the deflectors, the internal surface of the glass chimney is maintained in a clean and efficient state, and the temperature of the glass chimney is considerably lower than ordinarily with Argand burners; thus flames of much greater intensity than hitherto produced can be employed without risk of breakage of the glass chimney. An intensity of nearly 1,500 candles has been obtained with these burners without damage to the glass chimney, and the intensity per square inch of the sectional area of the flames in the vertical plane is believed to be the highest yet obtained with any burner for oil or gas. The simplicity of construction of the burner, the high intensity and focal compactness of its flame, together with the economy of fuel, combine to render it, in the author's opinion, the most efficient burner yet produced for any illuminating oil or gas.

The placing of the lamp in the pedestal of the illuminating apparatus affords more room for the lightkeeper in the manipulation of the burner than when set on the lamp stage in the usual way; moreover, it is a much safer arrangement as regards fire where mineral oil is consumed.

The improved lamp reservoirs and pumps for the supply of oil to the burners, two of which are provided, were designed by Sir James Douglass for the Anvil Point lighthouse in 1880. The improvements in these lamps consist in the introduction of a hollow weighted plunger for driving the oil to the level required for each burner; also the application of a double-acting pump for raising the plunger, in lieu of a rack and pinion, or a pitch chain with weights as hitherto. The apparatus is less costly and less liable to accident than the different lighthouse lamps now in use. The only parts subject to wear are the pump leathers, and others are substituted by the light-keepers whenever new ones are required. Two reservoirs and plungers are ordinarily in use, but the light can be maintained by one, so that in case of accident to either, the disabled lamp can be disconnected and sent ashore for repairs.

The driving machine is arranged for striking the fog-bells, in addition to the rotation of the optical apparatus. The machine is driven by an endless balanced pitch-chain, with an arrangement for maintaining the power during the process of winding. The driving weights are placed in an iron trunk in the lower rooms of the tower, and are connected with the pulleys and pitch-chain by a ¾-inch chain, the latter passing through an iron tube at the center of the tower. A small "Bucket" caloric engine, of one-half effective horse power, is intended to be fixed in the service room, for relieving the light-keepers of the excessive strain of driving the machine when both illuminating apparatus and fog bell are in use. The engine is now under practical trial at the workshops of the Trinity House, preparatory to its being fixed at the lighthouse. The speed of the machine is regulated by a "Slight" centrifugal governor, and is provided with an indicator dial; also gear for rotating by hand in case of accident to the machine. With a clear atmosphere, and the light of the Plymouth Breakwater lighthouse, ten miles distant, distinctly visible, the lower burner is worked at its minimum intensity of 450 candles, giving an intensity of the flashes of the optical apparatus of 37,800 candles nearly; but whenever the atmosphere is so thick as to impair the visibility of the Breakwater-light, the full power of the two burners is immediately put in action, with the aggregate intensity of 1,900 candles for the lamps, and an intensity of the optical apparatus of 159,600 candles nearly. This intensity is about 23.3 times that of the fixed light latterly exhibited from Smeaton's tower, and about 2,382 times that of the light first exhibited in the tower from tallow candles. The intensity of the light is the highest that has yet been produced from oil for coast illumination.

The optical apparatus for the lower fixed light consists of two 21-inch paraboloidal reflectors, each fitted with a two-wick "Douglass" lamp. The intensity of this light is nearly 12,000 candles.

The focal plane of the upper light is 133 feet above high water. Its nautical range is 17½ miles, and during clear weather it over-laps the electric lights at the Lizard Point.

The Eddystone furnishes good evidence of the recent progress in lighthouse illumination, and of the enormous value of perfect optical apparatus for the utilization of the illuminant, both with regard to economy and its efficient service for the guidance of the mariner.

The original chandelier-light in Smeaton's lighthouse was unaided by optical apparatus; it consisted of 24 tallow candles, weighing two-fifths of a pound each. The intensity of the light of each candle has been found from experiments made by Sir James Douglass to have been about 2.8 standard sperm candles, thus the aggregate illuminating power radiating from the 24 candles was about 67.2 candle units. The consumption of the candles was about 3.4 pounds per hour, and the cost of the light per hour, at the current price of tallow candles, would be about 1s. 6¾d.

At the shore lighthouses of the Trinity House, where oil is employed as the illuminant, mineral oil is adopted as being the cheapest, while in point of efficiency it is equal to the best of the vegetable or animal illuminating oils. At the Eddystone, as at other rock lighthouses, as well as on board light-vessels, colza-oil is employed on account of its greater safety in use and storage. For the whole year during which the lamps of the main light at the Eddystone are burning between sunset and sunrise—4,412 hours—being about 2,941 hours clear weather, and 1,471 hours thick weather, the cost of the illuminating oil per hour, inclusive of wicks and glass chimneys, is 1s. 7½d. nearly, being only ¼d. more than the present cost per hour would be of the original candle-light at this station of only 1-2382 part of the intensity of the present light.

Spontaneous Ignition of Coal.

Durand ascribes the spontaneous ignition of coal to the presence of pyrites, Fayol claiming that the true cause of such ignition is due to the oxidation of the coal itself, the part played by the pyrites being entirely negative. A writer in the *Journal* of the Society of Chemical Industry notes that lignite in the state of fine dust takes fire at 150°, gas carbon at 200°, coke at 250°, and anthracite at 300° or above. On heating a mixture of finely powdered coal and pyrites to 200° for four days the coal took up 6 per cent. of oxygen, whilst the pyrites absorbed only 3.5 per cent. Hence coal absorbs oxygen much more energetically than pyrites does, which has also been confirmed by the following experiment: About 900 grams of powdered coal and 3,350 grams of powdered pyrites were placed in tin cans and put in a drying chamber. Up to 135° both behaved similarly; but from there the temperature of the pyrites remained almost stationary, whilst that of the coal quickly rose, ignition taking place after a few hours. Two other samples

of coal and pyrites were put in a chamber at 200°. The temperature of the coal quickly increased. After 40 minutes it got up to 200°, and the coal took fire, whilst the pyrites had at the same time only been raised to 150°. The ignition of the coal was not at all hastened by an admixture of pyrites.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Cheap Gas for Scranton, Pa.—At a meeting of the board of directors of the Scranton Gas and Water Company (the same board also having control of the Hyde Park Gas Company), held at Scranton, Pa., on date of May 5th last, Secretary Geo. B. Hand was authorized to make the following announcement to the gas consumers of that city: "From May 1st, 1884, the price of gas will be $1.80 per thousand cubic feet, subject to the following discounts: Ten per cent. on all bills where the consumption for the month amounts to less than $10; 15 per cent. on all bills where the consumption for month reaches $10 and up to $25; and 20 per cent. on all bills showing a monthly consumption of $25 and over in value—provided, in every case, that accounts be settled on or before the 20th day of the month in which the bill is presented."

Have Had Enough of the Oil Process.—It is understood that the owners of the Fostoria (Ohio) gas works have about gotten tired of the oil system of manufacture which they have been operating under, and propose to alter the works to a coal gas plant. While we are not given to the fanciful in prediction, and have no patent rights or processes of any sort or description to dispose of, either for cash or promises to pay, we think that there is a storm coming which will make many a piratical craft take in her canvas, provided there is sufficient time left to "pipe all hands above" to make things snug.

How the Pittsfield (Mass.) Gas Light Company Celebrated its Last Birthday.—The regular annual meeting of the Pittsfield (Mass.) Gas Light Company was held on Tuesday, May 6th, and the old board of directors was unanimously re-elected. The gentlemen composing the directorate are Messrs. Robert W. Adam, Edwin Clapp, W. G. Backus, Daniel J. Dodge, and William R. Plunkett. The President of the Company is Mr. Robert W. Adam, and Mr. R. Plunkett is Secretary and Treasurer.

Before going any further in the matter of the celebration, a short history of the Pittsfield corporation will not be out of place. The original charter of incorporation was registered in 1853, but organization was not perfected until date of April 4, 1854, the initial capitalization having been fixed at $40,000, subsequently being increased to $50,000, and again to $62,500, at which figure it now stands. The increased stock does not in any sense or manner represent an application of the by far too familiar "watering" process, but stands for actual moneys expended in extensions of plant. To make the truth of this statement apparent to even the most hardened sceptic, it need be only added that, in 1873, when the Pittsfield plant was greatly enlarged, one of the additions being the erection of a holder with a capacity of 70,000 cubic feet, besides new benches and increased main distribution facilities, but $12,500 was added to capital account, when the expenditure incurred really amounted to $34,000. The first president of the company was Mr. Thomas F. Plunkett, and the first secretary and treasurer was Mr. Robert W. Adam. The latter-named gentleman was chosen president in 1856, and has held the office ever since—a sufficiently good indorsement to warrant us in saying that his management is evidently of the most satisfactory sort. When the company first commenced the sale of gas, $4 per thousand cubic feet was the price charged, and during the stirring years from 1861 to 1865 the rate was advanced to $5. Successive reductions have been made since the latter year, and the policy of lower prices is to be strictly adhered to and faithfully carried out. Not only does the Pittsfield corporation believe in cheap prices, but is just as firm an advocate of the practice of sending out an excellent quality of gas product. Last year it stood third on the list of Massachusetts companies as to illuminating power, and during the last six months the average has been 20 candles. The short record here given would be incomplete without making some reference to the company's Superintendent, Mr. George S. Dunbar. Superintendent Dunbar succeeded Robert Faulkner in 1869, and possesses all the qualifications going to make a competent and careful manager.

Now for the "celebration." There was not much feasting or hilarity indulged in at the annual meeting, but a little resolution was placed upon the record which will surely be productive of rejoicing amongst Pittsfield's gas consumers, and, at the same time, make Supt. Dunbar, during the long nights of the coming winter, rather anxious as to his gasholder capacity. The resolution was this: "Voted, That the price of gas, on and after October 1st, be $3 per thousand, with discounts for prompt payment as follows: On bills for less than 1,000 feet per month, 50 cents—net, $2.50; for over 1,000 and less than 10,000, 60 cents—net price, $2.40; for over 10,000 and less than 50,000, 75 cents—net, $2.25; for over 50,000, net price, $2 per M." The company fairly states that this new schedule has been rendered possibl by the increased consumption of gas during the past year, the output for 1883-4 having been about twelve million cubic feet. The percentage of gain can be estimated from a statement of the make in 1880-1, which was returned as 7½ million. Judging from these figures, it will not be long before the Pittsfield folks will have to increase the capital stock again in order that the plant may be extended to meet the increased demand which the reduction just announced is sure to bring about.

Mouthpieces and Lids for the Gas Trust.—Mr. James R. Floyd, of the Oregon Iron Works, New York city, has been awarded a contract which calls for the supply of 360 mouthpieces, fitted with Green's patent self-sealing lids, to the Philadelphia (Pa.) Gas Trust. These lids are extensively employed at the works of the Manhattan Gas Light Company, New York city, and the sole right to manufacture the same is possessed by Mr. Floyd.

The Lynn (Mass.) Gas Company Makes a Reduction.—Mr. Charles C. Fry, Secretary of the Lynn Gas Light Company, has notified us that, from and after July 1st next, the gross charge for gas supplied to consumers will be reduced from $3 to $2.20 per thousand, bringing the net price down from $2.50 to $2 per thousand. The Lynn Company does not propose to stop at this, although the new rates are justly deemed liberal and fair. The numbers of reductions in gas prices recorded in this issue of the Journal plainly show what the ideas of the fraternity are in relation to making their position toward the problem of supplying artificial light safe and sound.

A Big Station Meter for the San Francisco (Cal.) Gas Company.—The American Meter Company, of 512 West 22d street, New York city, have in course of construction at their shops a station meter capable of registering a 24-hours' make of three million cubic feet. The meter is being built to the order of the San Francisco (Cal.) Gas Light Company.

Electric Light for Sioux Falls, Dakota Ter.—Sioux Falls has had the "electric fever" rather badly for some time back, and a man named Richardson has undertaken the task of relieving the citizens from their anguish. On April 23 last Mr. Richardson's efforts had been so far successful that he started up his dynamos with only 13 arc lights in circuit. The daily paper of the town gives great credit to Mr. Richardson for his enterprise, although the same authority appears disposed to cavil at the system of turning off the current at midnight. Fargo and Deadwood are the only other towns in Dakota that "bask in the pale electric ray," consequently Sioux Falls rejoices at being numbered among the chosen. The fever of the Sioux Falls citizens may have been cured by Mr. Richardson's celerity; but who will cure the "anguish" that Mr. Richardson's depleted pocket-book must experience in the days that are sure to come? Mr. R. had better have taken out a charter for a gas works; he would have gotten just as much credit, and the after-effects on his bank account would be decidedly more consoling.

Cheaper Gas for Atlanta, Ga.—At a regular meeting of the board of directors of the Atlanta (Ga.) Gas Light Company, held April 30, Mr. R. J. Lowry said, in view of the increased demand made upon the Atlanta Company for gas, and considering the recent reduction in prices of bituminous coal and freight carriers rates, he thought it would be a wise policy on the part of the company to give the gas consumers a proportion of the benefits so accruing in the shape of a lower charge for the gas burned by them. He, therefore, moved that Secretary J. H. Mecaslin be instructed to notify the patrons of the company, and the citizens of Atlanta generally, that on and after July 1st next the price to be charged would be as follows: $1.80 per 1,000 cubic feet, subject to a discount of 30 cents per thousand when the bills are paid at the office of company on or before the seventh day of month in which they are rendered, this proviso virtually bringing the cost to $1.50 per 1,000, net. The motion was unanimously agreed to; and while the credit of taking the initiatory steps is given to Mr. Lowry, it is just possible that the real originator of the plan is Mr. William Helme, of Philadelphia, Pa., who is largely interested in the Atlanta works; and when it comes to a question of "backbone" the self same gentleman is about as well equipped in that particular line as any other "gas man" in the country.

To show how the scheme works to the benefit of the Atlanta corporation, we will here submit a clipping from the Atlanta *Constitution*, the leading newspaper of the city, indeed, if not the most influential daily in the Southern States:

"As will be seen by a notice elsewhere the old reliable Atlanta Gas Light Company has again made a reduction in the price of gas, this time bringing it down to $1.50 per 1,000 feet. As the demand increases, as is steadily being done with the growth of the city, the company will give consumers the benefit of every advantage which accompanies the reduction in material and freight.

"The city of Atlanta is to be congratulated on having a company which, without opposition, and on their own motion, voluntarily gives its patrons the benefit of such a reduction. The price now fixed is but little above the

real cost of production, and if other companies propose cheaper rates than that now fixed, other processes and those not yet known will have to be depended on, or else unusually intelligent and active meters will be required. The managers of the company certainly deserve the thanks of all the consumers in the city for their liberality."

FUEL GAS FOR JAMESTOWN, N. Y.—President A. F. Kent has concluded to go into the business of supplying a cheap, non-carburetted water gas, for fuel purposes, to the inhabitants of Jamestown. It is proposed to expend upwards of $30,000 in plant and mains, and the anticipation is that matters will have progressed sufficiently to allow sales to begin by August 1. Mr. W. A. Kent was recently elected a director of the Jamestown Company, and shortly afterwards selected as its treasurer. As we understand it the manufacture of illuminating gas is to be carried on at Jamestown under the old conditions, and that separate mains and meters will be laid on for conveying the heating gas to, and registering it at, points of consumption. Mr. A. F. Kent still retains the presidency of the Jamestown Gas Company, resigning the position of treasurer in order that he might have greater freedom to attend to outside details. The newly-elected treasurer will attend to inside matters.

NOTICE OF REMOVAL.—Mr. William Farmer, whose long and honorable career in the profession of gas engineering has made his name familiar to the fraternity the world over, has removed his offices from 111 Broadway, Trinity Bnilding, where he was to be found on duty for the past 13 years, to No. 32 Park Place, room 36, New York city. The change is a good one, and we wish the best of luck may follow the "move."

THE ST. PAUL (MINN.) GAS LIGHT COMPANY REDUCES THE PRICE OF GAS.—The board of directors of the St. Paul Gas Light Company, at a meeting held April 20, considered the question of gas prices, the result of the discussion being that St. Paul's gas consumers are to get their light at much lower rates that those hitherto charged. The former gross price was $4 per 1,000, with discounts of from 25 to 40 per cent., according to quantities burned. President H. H. Sibley's notification to the people of St. Paul, as to the future schedule rates, says that "from and after the first day of June next the price of gas will be reduced to $3 per 1,000 feet, with a further reduction of 50 cents per 1,000 on all bills under $100; 75 cents per 1,000 will be deducted on such monthly bills as show a consumption exceeding $100—the reduced rates only applying to bills paid at the office of the company on or before the tenth day of the month in which they are presented." In the January 2d issue of the JOURNAL we gave some account of what was being done by the St. Paul "gas men," and showed then that in the two preceding years some $75,000 had been expended by the officers of the company in perfecting and extending works, mains, etc. Judging from the new schedule of gas rates, General Sibley appears as though he were setting out on the way towards making necessary the expenditure of a further similar sum in the near future in order that the increased demand for gas may be promptly met.

NEW GAS COMPANIES.—It is understood that the newly incorporated township of Sheffield, Colbert County, Alabama, is shortly to erect a gas works. The town of Owosso, Michigan, is also to be lighted with gas; a company incorporated under the name of the Owosso Heating and Lighting Company, with a capital stock of $30,000, proposes to undertake the task.

ANNUAL MEETING OF THE WILMINGTON (N. C.) GAS LIGHT COMPANY.—The stockholders annual meeting of the Wilmington (North Carolina) Gas Light Company was held at the company's office on Thursday, May 8, Mr. E. T. Hancock occupying the position of chairman, and Mr. George R. French acting as secretary. A ballot for directors for the ensuing year resulted in the choice of Messrs. Edward Kidder, Donald MacRae, William H. McRary, E. S. Martin, George R. French, Dr. A. J. De Rosset and R. J. Jones. When the annual meeting was declared adjourned the board of directors organized by the selection of Mr. Edward Kidder as President; R. J. Jones, Secretary and Treasurer; John V. Reilly, Engineer and Superintendent. A comparison of these names with the list of officials who served in similar capacities during 1883-4 shows no change. We are pleased to add that the business of gas manufacturing in the State of North Carolina is decidedly improved and improving, and there does not seem to be any good reason why the close of 1884 should not show a really prosperous condition of affairs with the gas maker over the entire South.

WHAT WILL THEY DO WITH IT?—News reaches us, by way of a Baltimore paper, that, "owing to a conflict of interest between Mr. H. Y. Attrill and Commodore Garrison, the former gentleman has severed his connection with the Equitable Gas Company of Baltimore." This may be news to some, while undoubtedly it does not possess any particularly great store of information for others. There are quite a number of gentlemen financially interested in divers gas undertakings at the present time who doubtless wish that Mr. Attrill had "severed his connection" with them a long time before he did cut the "knot," and these gentlemen may now be consoling themselves with reiterating the truly philosophical statement (under the particular circumstances) that it "was better late than never." It would seem that while Mr. Attrill is disposed to drift apart from the Commodore, financially and otherwise, he is in no sense inclined to "steer his bark" away from the "troubled sea" of Baltimore gas supply, but, on the contrary, intimates that as soon as he has "finished the building of a railway from (or to) his gas coal mines in West Virginia," he proposes, with the "aid of *other* capitalists of New York and Brooklyn, to establish another gas company in Baltimore." Not only is he going to start another gas works there, but he is to furnish the "citizens of Baltimore" with a richer gas than is now supplied them, and at about one half the price. It strikes us that Mr. Attrill is getting more philanthropical than ever, since gas is now sold in Baltimore at about an average price of $1 per thousand; and unless he proposes to "exhaust" himself into his holders by the medium of persistent "blowing," we fail to note where Mr. Attrill's profit is coming in, unless perchance the astute gentleman is figuring on the dimensions and contents of the wallets possessed by the "other capitalists of New York and Brooklyn." Seriously speaking, it would be nothing short of criminal were Mr. Attrill and his associates encouraged to operate another gas works in the "Monumental City;" and we hope, although the past action of the consumers there leaves but slim grounds for such expectation, that the desired pledges will not be obtained.

EXPLOSION OF NATURAL GAS.—A Press despatch, dated Oil City, Pa., May 5, says that a tremendous explosion of natural gas occurred at Shefield, Warren county, late on the night of May 4. It appears that a frame dwelling, occupied by a large number of Hungarian laborers, was lighted and heated through the agency of natural gas, and the disaster was occasioned by a leaky supply pipe. The gas, escaping at high pressure, speedily filled the tenement, and the inevitable spark or naked light "set off" the explosive mixture of gas and air. The building was blown to fragments, and, strange to relate, none of the occupants were killed, although most of them received injuries of a more or less serious character.

A BURNING POLE.—On the evening of May 11th a pole owned by the Brush Electric Light Company, located at the corner of Twenty-first street and Third avenue, New York city, was set on fire by an arc light wire. The cause of the trouble was assigned to the fact that the "pole was green."

REWARDED FOR DOING THE "RIGHT THING."—We noted in our last issue that the North Adams Gas Light Company had taken a step in the right direction by reducing its selling price, and the effect such action exerted upon the minds of the local authorities appears to have taken practical shape very quickly. It is quite well understood that "local boards" often experience severe attacks of economy; the North Adams board went through this peculiar disease some four years ago, and to relieve, in a measure, the acute stage of their trouble, ordered that oil lamps be substituted in the city's street lanterns for the gas burners theretofore used. Four years' practice of this heroic remedy, joined to the liberality of the offer made by the North Adams Gas Light Company, has enabled the board to see the error of its ways, and on May 5th a contract was entered into with the gas company which authorizes the re-establishment of the gas system of street lighting. This, too, in face of the fact that the electric lighting promoters were very anxious to introduce their methods and plant; but a careful examination of the relative cost and benefits to be derived from working under the different systems quickly decided the "balance" in favor of the gas burner. The price agreed upon was $22.50 per post per annum when equipped with 4-feet burners, or $25 if 5-feet burners were used—the lights to burn all night and every night in the year. Treasurer Richardson ought to feel somewhat elated over this victory.

SUFFOCATED BY GAS.—A young woman, who registered at the Niagara Hotel, Baltimore, Md., under the name of Edna Tate, of Harper's Ferry, Va., on the night of May 8th, was found dead in her bed on the afternoon of the following day, having been suffocated through the inhalation of illuminating gas. Colonel Joyce, proprietor of the hotel, says that when he entered Miss Tate's room the gas burner was found turned fully on, and the windows and doors were tightly closed. It is said that the young woman, upon her arrival at the hotel, was accompanied by a middle-aged man, who remained with her but a few moments, and this companion had not been seen or heard from since.

BROOKLYN (N. Y.) TO HAVE ELECTRIC LIGHT.—In the last issue of the JOURNAL we made mention of the fact that a number of electric lighting promoters were before the Board of Aldermen of that city praying permission be granted them to string wires, to the end that they might be enabled to supply the electric current to those who wished to pay for it. From the

general tenor of the previous discussions indulged in by the members of the Board it was deemed this permission would not be accorded until the Legislature had finally determined whether the bill compelling all electric lighting companies to bury their conducting wires should become a law or not. It was futile to think this conservative sort of policy would prevail to the end; for, true to its traditions, instead of adhering to the policy which one might think would naturally be foreshadowed by the arguments indulged in at previous sessions, this august assemblage, following out its reasoning in a manner precisely similar to the style in which the crab manages to "cover" the distance intervening between two given points, quietly and peacefully, at the meeting held Monday, May 5, granted franchises to two sets of the petitioners. The resolutions adopted give the right to Messrs. Pope, Sewell & Co., otherwise known as the Citizens Electric Illuminating Company, to install all the necessary apparatus for conveying electricity for purposes of illumination to any point in the Western section of the city, while to Messrs. Charles Cooper & Co., meaning the Kings County Electric Light Company, is given the privilege of carrying out the same measures in the Eastern end of the town. One section of the grant conveys the information that the "grantees are to possess the rights to erect poles 'or other equivalents' in the streets for the purpose of attaching electric wires and appliances thereto; or, at the option of the Commissioner of City Works, to use lamp posts, with vertical extensions, in lieu of the ordinary poles." Here are some more of the "provisions;" but a careful reading of them fails to convince us that there is much "fodder" for the city therein, despite all the lights that are to be furnished for nothing:

"Each of said grantees shall erect and maintain four electric lights for the city, of 2,000 candle power each, free of charge, and in addition thereto one electric light for each fifty lights furnished by it to private subscribers or, so long as said grantees enjoy exclusive right from the city in their respective districts for furnishing electric lights, one light to the city free of charge for each thirty lights furnished to private subscribers, said lights to be erected at such places upon the line of the circuit operated by said grantees as the Commissioner of Public Works may prescribe.

"Lights furnished to the city, in addition to the free lights before mentioned, to be so furnished at a cost not to exceed 70 cents per night, and all lights furnished the city to burn all night. The lights to private consumers to be so furnished at an expense not to exceed 75 cents per night per light, for the customary hours of service in other cities."

The promise of the petitioners, or rather the grantees, of giving the city an additional free light for every thirty lamps supplied to private consumers, provided *exclusive* right be given the operators in their respective districts, is rather a cheap catchpenny, and its evident shoddy, not to say "cottony," character is particularly visible when viewed through the lenses of the first proposition to supply only one free light for every fifty private lights when the advantages of "exclusiveness" are not thrown in. To the credit of Alderman Dimon it must be said that he stood up manfully for the underground placing of the conductors, but it was a "bad day" for common sense in the Brooklyn Aldermanic Council Chamber—indeed, the only wonder is to find one of that body's good days. It was thought, a day or two after the grants had been given, that Mayor Lowe might possibly interpose a veto to the scheme, and we hope to have the satisfaction hereafter of saying that he did.

[Since the above was written, Mayor Lowe, while he did not exactly veto the matters spoken of, suggested that some modifications be made in the resolutions, and sent to the Common Council, at its session of May 12, a list of changes that he thought would be desirable. The Board promptly reconsidered its action of May 5, and immediately fell in line with the Mayor's propositions. We are sorry to add that the "improved" scheme appears to be just about as lame as the action first taken.]

Old Wooden Water Pipes.—During the course of excavations in certain streets in the section of New York city below Maiden Lane, in the district formerly partially supplied with water by the old Manhattan Company, now the Manhattan Banking Company, the diggers are constantly exposing to view portions of the old wooden pipes which served as water conduits over half a century ago. We have in the Journal office a section of one of these conduits, taken up when the New York Steam Heating Company was opening its trenches. It is of spruce, almost 7 inches in diameter at the thickest part, and the diameter of bore-hole averages 2¼ inches. While not in the most complete state of preservation, it would still answer the purpose for which it was originally put down. This little history was brought out through reading an account of the May 3d meeting of the Engineers' Club of Philadelphia, Pa., at which session Mr. C. H. Roney exhibited a section of 4-inch wooden water pipe and joint, discovered about 2 feet below the surface by workmen excavating a trench for the conduit of the Philadelphia Sectional Electric Underground Company, on Chestnut street, between Fourth and Fifth, in that city. The exhibitor also described specimens which had been found on other streets during the progress of the same work; these descriptions were interesting as showing the durability of such pipes and connections under the conditions to which they had been subjected, and the length of time they were buried. The specimen at this office, it should be said, was found in a bed of sharp, brownish-red building sand, and at a depth of about 4 feet.

Consumer's Gas Company, of Jersey City, N. J.—Mr. Orestes Cleveland and Mr. Walter A. Shields have been chosen to fill the respective offices of President and Secretary to the Consumers Gas Light Company, of Jersey City.

The Market for Gas Securities.

The market for city gas shares presents a striking contrast to the market for railway shares. A decided panic has taken possession of the money center, and at the time of writing (2 P. M., May 14) a perfect pandemonium prevails in Wall street; and no wonder it does, for what were reckoned as among the most enduring financial houses have closed their doors. At this hour the wrecks already announced are those of the Metropolitan Bank, Hatch & Foote, Goff & Randall, Nelson Robinson & Co., and O. M. Bogart & Co., with the names of many others mentioned as likely to follow. Naturally enough investors are anxious, and the outlook is decidedly black. Railway and telegraph shares have suffered greatly in depreciation of prices, and it must be but a question of time, and short time at that, when even gas shares will feel the depressing effects of want of confidence in the stability of the times. We would like to place ourselves on record as saying that never at any time has the condition of city gas shares been stronger than at present, nor the outlook for the future more encouraging. The various companies are on a strong footing, their business is increasing, and their ability to pay regular dividends undoubted. Holders of these securities should not part with them, even though prices, for a time, be depressed. City shares are strong, more particularly Manhattan, Metropolitan and New York.

Brooklyn city gas shares are fairly steady, and Washington (D. C.) gas records another marked increase in value, the bid price being 210, as against 200 on May 2. For regular quotations see list on next page.

Correspondence

[The Journal is not responsible for the opinions expressed by correspondents.]

A Correspondent Gives His Views about Dr. Love's Letter to the "Sanitary Engineer"

Westerly, R. I., May 10, 1884.

To the Editor American Gas Light Journal:

I saw in one of the newspapers, some days since, a letter written by Dr. E. G. Love, regarding the report of the Board of Health, as made and submitted to the Legislature of the State of New York, on the manufacture and use of water gas. The Doctor seems to feel somewhat "touchy" on the subject, and well he may, for, with you, from what I can learn, it does seem to have been a regular one-sided affair. Happening to be in Brooklyn, N. Y., a few days after that remarkable report was published, I called on the president of one of the largest gas companies of that city, and he informed me that he knew nothing of the matter until the morning before he saw the report in print; he also informed me that the president of another Brooklyn gas company had no notice of the meeting of a legislative committee on this subject. Dr. Love says, "All parties had equal notice of the hearing;" now, if all parties did have equal notice, it must follow that none of them received notice of this meeting, except, perhaps, Dr. Chandler and the three chemists who signed this remarkable report. Dr. Love also informs us that his mind was already made up, "long before the question was raised in the Assembly."

Now, Mr. Editor, down in this part of the country we are just old-fashioned enough to believe that a man who has already made up his mind which way to decide a case, before hearing both parties, is not just exactly a square man; and entertaining this view I can see why Dr. Love should feel "touchy," when you pronounced the report the "veriest sort of a farce."

Dr. Love also says, "I feel confident that the other chemists will say the same."

Now, Mr. Editor, if all your chemists make up their minds upon the great questions of the day as readily as Dr. Love says he did, and as he thinks the other chemists did, what chance is there for any subject ever hereafter having a fair hearing, and, knowing this, who will ever again submit any question of importance to persons unless he knows what their decision is to be before submitting it. We hear every day how much it costs for opinions; and, if we are to judge of men's actions by what is written, verily there will be more farces enacted, and men will not blush, at least in public, to see their names appended to such "farces."

Pawatuck.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks (with W. B. Scott & co.,)

34 Pine Street, New York City.

May 16.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share. ☜

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Equitable	2,000,000	100	93	95
Harlem	1,800,000	50	118	121
" Bonds	170,000		—	—
Manhattan	4,000,000	50	278	281
Metropolitan	2,500,000	100	234	236
" Bonds	658,000	—	107	110
Mutual	3,500,000	100	132	135
" Bonds	1,500,000	1000	104	106
Municipal	3,000,000	100	213	215
" Bonds	750,000		107	110
New York	4,000,000	100	155	158
Northern	125,000	50	70	80
" Scrip	108,000			
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	133	136
Citizens	1,200,000	20	92	95
Fulton Municipal	1,500,000	100	138	142
Peoples	1,000,000	10	82	85
Metropolitan	1,000,000	100	92	95
Nassau	1,000,000	25	105	—
" Ctfs	700,000	1000	85	90
Williamsburgh	1,000,000	50	125	130

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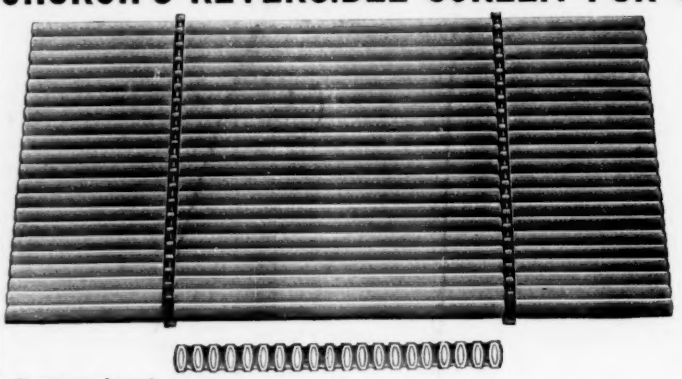

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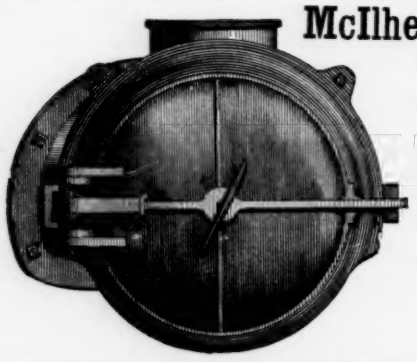

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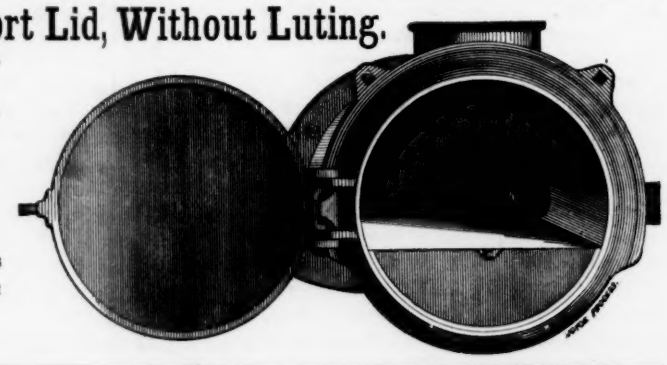

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